TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

DECEMBER 15, 1960
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V64 #24

REGULATION AND THE PUBLIC INTEREST, by J. J. Brown

The Buried Telephone Service Concept, by John S. Reed

DEVELOPING RURAL TELEPHONE SERVICE, by D. A. Hamil

How Useful Are Office Comparisons? by D. A. Perigo

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TELEPHONE ENGINEER & MANAGEMENT

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THE TE&M FRONT COVER

Those responsible for planning of the Wisconsin State Telephone Association's Sixth Fall Conference held at Eau Claire, Wisconsin in October pose with one of the "props" used in a discussion relatin gto Marketing. Appearing left to right are: WARREN KIRK, plant manager, Luck Telephone Co.; RAY J. RIORDAN, secretary, Wisconsin State Telephone Association; JAMES SMITH, general manager, St. Croix, Telephone Co., New Richmond; JACOB MACOISEK, president, Chequamegon Telephone Cooperative, Cable; Mrs. EDNA LOKKEN, Fall Conference Committee Chairman and manager, Baldwin Telephone Co.; and L. J. ROBERTSON, president, Wisconsin State Telephone Association, and general manager, Platteville Telephone Co. Committee members not present when the picture was taken are Byron C. Dale, manager, Nelson Telephone Cooperative, Durand; and J. F. Benjamin, president, Cumberland Telephone Co. Secretary Riordan tells us — "From all the records I can find this is the first time a woman ever served as Chairman of a Wisconsin Association committee and I must say she did a wonderful job. The Fall Conference, an event we started in 1955 was held in the Eau Claire Hotel at Eau Claire, as it has been the past six years. Total registration was 188, up 12% over 1959 and even moreimportant is the fact these people came from 73 operating companies."

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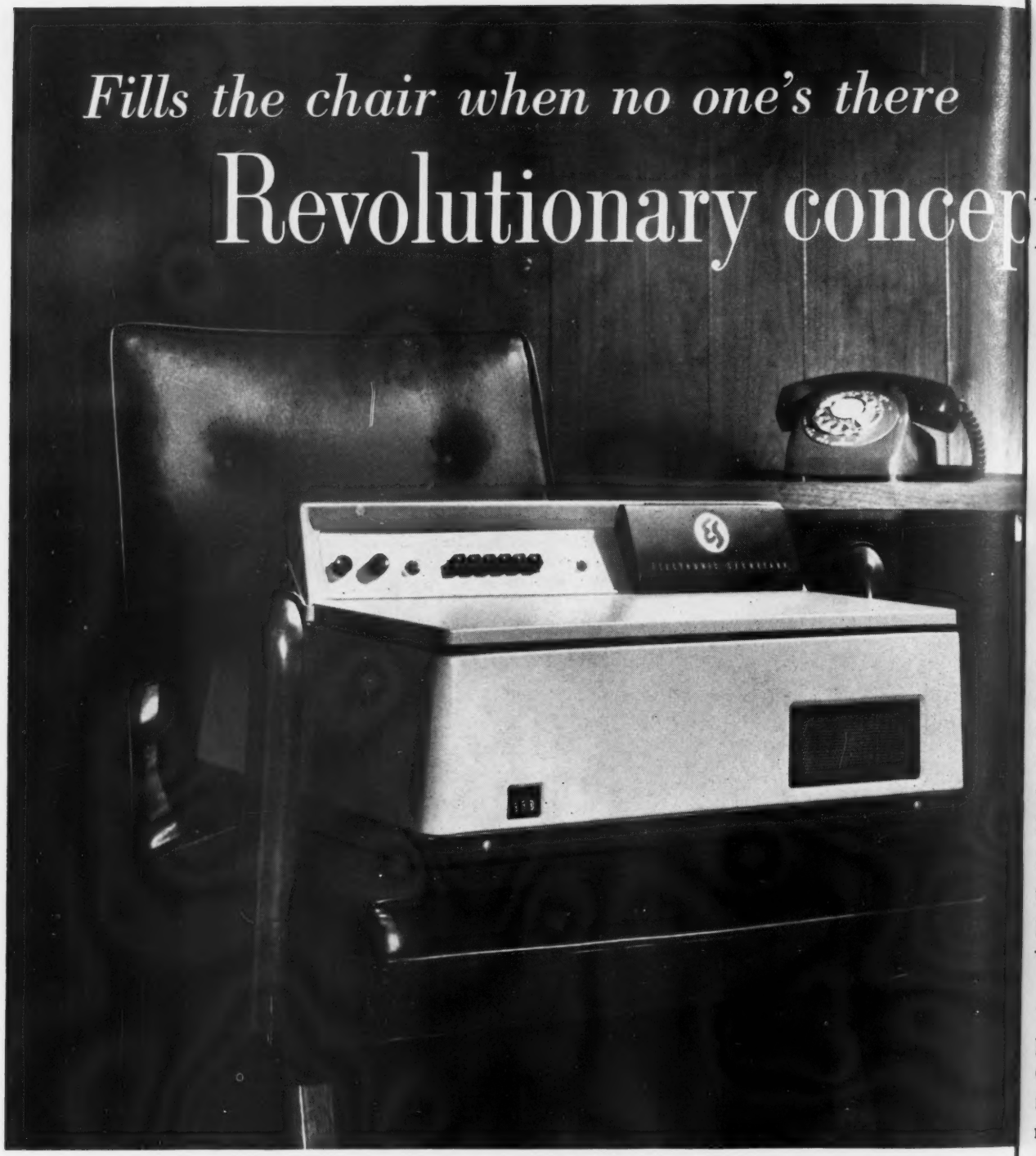
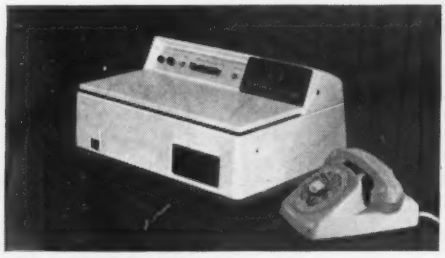
POSTMASTER . . . Please send form 3579 to TELEPHONE ENGINEER & MANAGEMENT, 7720 N. Sheridan Rd., Chicago 26, Ill.

Fills the chair when no one's there

Revolutionary concept



New line of ELECTRONIC SECRETARY telephone answering sets

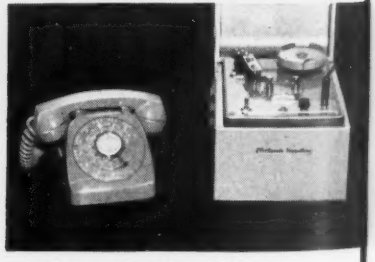


LP(Long Play) model

The de luxe model that "does everything." Answers the phone automatically with message prerecorded by customer—(easily "erased" and changed)—records incoming messages, plays them back when customer returns. Takes any number of incoming messages up to 2-hour capacity. For service companies and individuals, stores, offices, plants and specialized uses in many other types of business.

SP (Short Play) model

This performs the same answering function as the LP model but has a more limited capacity. Answers the phone, gives message to caller, records up to twelve 13-second incoming messages. Compact, about typewriter size. Specially designed for the small service outfit or business. Low monthly rental greatly broadens the market.



AO (Answer Only) model

Answers phone with prerecorded announcer does not record incoming calls. Has microp tape recorder. Used by all sorts of organiz deliver informative announcements up to 3 Theatres tell what's playing. Fuel suppliers a leave numbers to call for emergency service Advertisers sponsor weather reports, stock Churches give inspirational messages.

f telephone service now made available to meet every customer's needs

Traditionally, telephone service has been based on this simple proposition: when the phone rings, someone must be there to answer it. Then came a major breakthrough—telephone answering when no one is there—with fully automatic ELECTRONIC SECRETARY® phone answering sets.

And now, for the first time, a complete line of these remarkable devices is available to help expand your profits into entirely new areas.

Virtually unlimited market

Today, ELECTRONIC SECRETARY sets are being produced in three basic models. No matter what kind of business or service organizations your customers run—no matter how large or small their companies may be—there is an ELECTRONIC SECRETARY set to provide just the kind of *fully automated answering they need.*

Just think how many of your customers are realtors, contractors, doctors, radio-TV repairmen—men in service businesses or professions who cannot afford to miss phone calls. Now you can offer them a practical device that answers the phone automatically—24 hours a day, 7 days a week—all for a modest monthly rental.

Think of all the larger business firms that can save time and money by having sales orders and reports phoned into an ELECTRONIC SECRETARY set. Finally, consider the many organizations who can benefit from "Answer Only" models—which make information announcements. They all add up to massive new markets for you.

National advertising now being readied

A powerful advertising program for the ELECTRONIC SECRETARY line means profitable business if you're ready for it. If you're interested in new revenue, we suggest you call or write either of the distributors listed below.

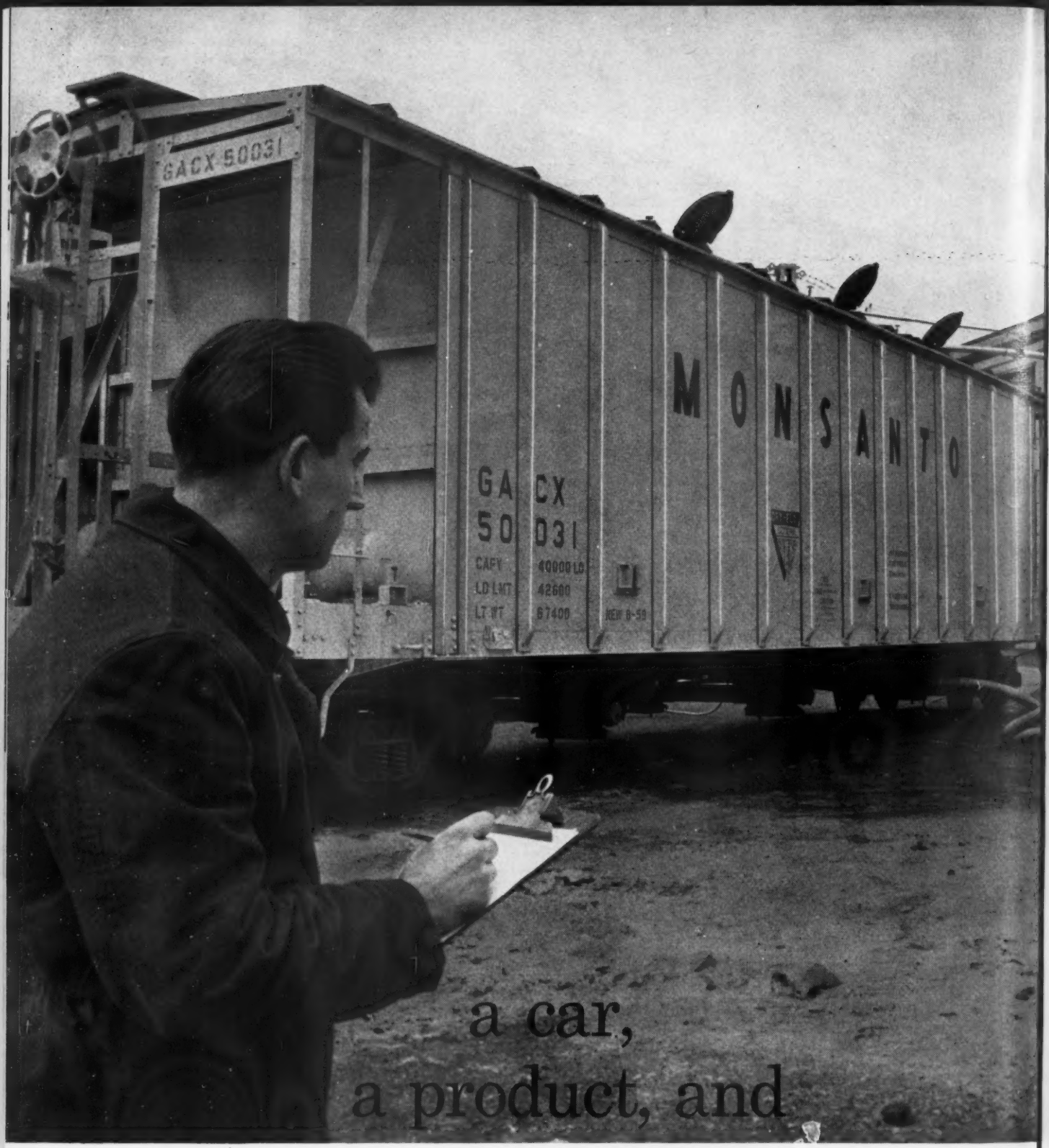
Electronic Secretary Industries, Inc., Subsidiary of GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

distributed by

AUTOMATIC ELECTRIC SALES CORPORATION
400 North Wolf Road Northlake, Illinois

LEICH SALES CORPORATION
427 West Randolph St., Chicago 6, Illinois



a car, a product, and a valuable new service...

This car carried the first Monsanto bulk-hopper shipment of weather resistant polyethylene compound to Western Electric's Kearny Plant. The polyethylene was Monsanto's 14202, now approved by Western Electric for high molecular weight black polyethylene telephone cable jacket applications. And this bulk handling service for polyethylene is one of a long list of Monsanto developments with immediate value to wire and cable manufacturers in cutting material costs, increasing plant efficiency, and improving products. If you are considering bulk handling for your plant, send for a new Monsanto report based on a comprehensive 5-year study of the subject. Monsanto Chemical Company, Plastics Division, Room 736, Springfield 2, Massachusetts.

Monsanto

MONSANTO ACTIVATOR IN **PLASTICS**

PROFIT

by installing

COOK

BD PEDESTALS

and accessories

Featuring:

- Faster, easier installations.
- Greater accessibility.
- Captivated bolts.
- Fewer loose parts.
- A full line of accessory equipment.

BD PEDESTALS

Catalog Number	BD Type	Prot. & Unprot. Term Blk. Cap.		Load Coil Capacity		Maximum Cable To Be Spliced	
		Qty	Size	Qty	Size	Pairs	Gauge
521-100	1	2	1 pr.	2	1 pr.	2 buried wires	
521-119	2	3	6 pr.	2	3 pr.	18	22
521-120	3	6	3 or 6 pr.	6	3 pr.	100	22
521-166	4	10	3 or 6 pr.	10	3 pr.	400	22
521-130	1A	2	1 pr.	2	1 pr.	2 buried wires	
521-110	2A	3	6 pr.	2	3 pr.	18	22
521-136	3A	6	3 or 6 pr.	6	3 pr.	100	22
521-183	4A	10	3 or 6 pr.	10	3 pr.	400	22

BD TERMINAL ACCESSORIES

Catalog Number	Protected Terminal Blocks, Without Leads
81-280	3 pair, with 41-285 arrester.
81-281	6 pair, with 41-285 arrester.
81-285	3 pair, with 41-610 arrester.
81-286	6 pair, with 41-610 arrester.
81-200	6 pair, unprotected terminal block, without leads.
81-184	6 pair, washer gap protected, without leads.

See your local distributor

COOK ELECTRIC Company

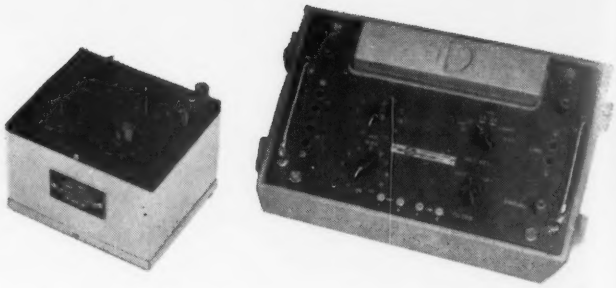
Since 1897

2700 SOUTHPORT AVENUE CHICAGO 14, ILLINOIS

AIRTRONICS Far-end Terminating Set, designed to be used in conjunction with the Model 20B Test Hybrid, supplies the Far-end terminations required for return loss and singing-point tests.

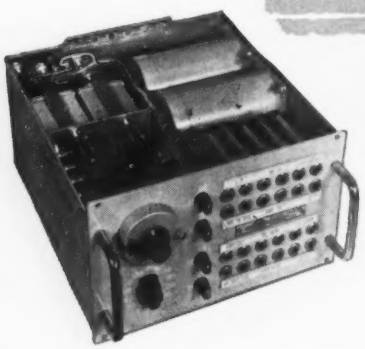
Generally, two precision networks, 115H and 115AL cover the standard cable layouts in exchange plant, (the 115H covering 19 and 22 gauge H88 facilities).

The Far-end Terminating Set consists of a precision network, network build-out decades, selector switch and jacks, and binding posts to give flexible access to the components.



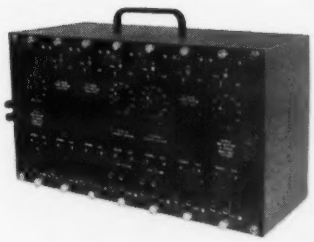
AIRTRONICS new multi-purpose, Portable Test Hybrid Set, Model 20B, makes acceptance, evaluation, and capacity balance tests easier, faster . . . locates cable opens accurately . . . accommodates standard networks. Either Singing-Point or Return Loss techniques can be applied. Accessories include external decade capacitor and variable resistor for use in locating opens, for compromise net, etc. Plug-in dial is also available.

DEPENDABLE PRODUCTS FOR MODERN TELEPHONY



AIRTRONICS completely self-contained Program Equalizer cuts line-up time from hours to minutes. Designed for operating on standard program-loaded or non-loaded communications cables, this unit features pre-tuned circuits in 1½ KC steps from 5 KC to 25 KC. Simple switch adjustments control insertion loss of the LC network, select values of L and C, regulate line-to-drop ratios, control the circuit location of the RLC network etc. Available in portable, wall-mounting, or standard 19" or 23" rack-mounting arrangements.

AIRTRONICS Pulse Meter is compact, easily carried, and plugs into the nearest 115 volt, 60 cycle ac wall outlet. Developed by telephone men FOR telephone men, the new pulse meter and power supply measures dial pulses from 0 to 15 pulses per second and percent make from 0 to 100 percent. It will accept loop, ground, battery, carrier, and polar-duplex pulses. Simple in operation, it can be easily carried and used at the test board, the telephone instrument repair bench — any place in the telephone exchange. For that matter, it can easily be moved to the actual subscriber instrument if the need arises. As an added bonus, the PMVPS-1 also gives you a dc power supply continuously variable from 0 to 300 volts. Use it to check transistor circuits, vacuum tube circuits, as a stand-by power supply — the sky is the limit! Best of all, you will be surprised that so much can be purchased for such a low price!



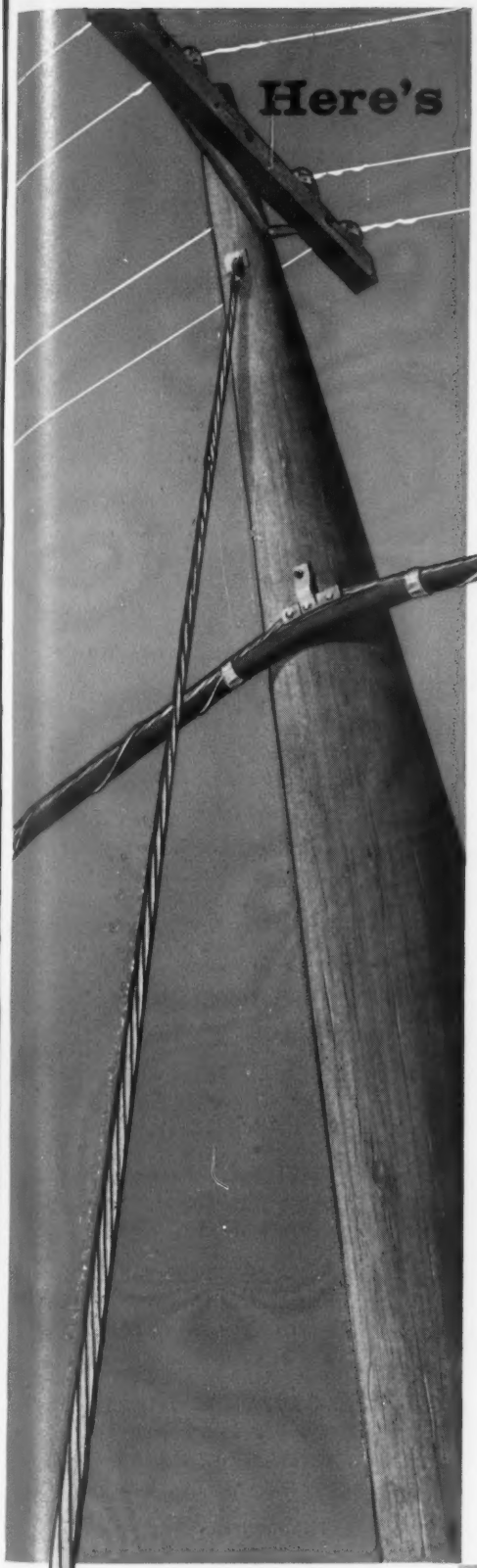
AIRTRONICS standard Artificial Lines accurately simulate a loaded or non-loaded cable pair of any desired length — from 600 to 39,600 feet.* Multi-position switches afford instant control over total length or load section lengths, so that coil spacings may be set to better than 1%, or as much as 10%. Common irregularities such as bridged taps, mixed loading or coils omitted can be introduced in a moment.

*Available with plug-in units for either #22 or #24 gauge cable, or mixed 22 and 24 gauge. Other commonly used gauges available on special order.

another product FIRST from

AIRTRONICS INTERNATIONAL CORPORATION

P.O. Box 8576, Fort Lauderdale, Florida (6900 West Road 84)



Here's PERMANENT SUPPORT

for your Poles

and Aerial Cables

ALUMOWELD®

guy and messenger strand

You can forget all about maintenance costs when you install Alumoweld Strand. This low-cost guy and messenger strand is designed to last as long as the pole it guys or the cable it supports.

A thick cladding of pure aluminum gives Alumoweld the same high resistance to corrosion as solid aluminum. This protective aluminum covering, which will never crack, flake or peel, is inseparably welded to the steel core by the unique controlled atomic-welding process. As a result, the strong steel core is constantly protected against corrosive attack and its original high strength is permanently maintained.

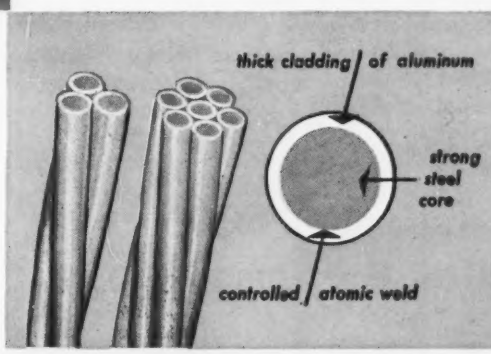
Alumoweld is as strong as steel. And its light weight—18% less than steel of comparable diameter—makes it easier to handle, easier to install.

Supplies of Alumoweld Guy and Messenger Strand are available for prompt shipment to you from our warehouses in New York, Chicago, Pittsburgh and Memphis.

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION Glassport, Pa.

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York



Alumoweld's thick aluminum covering—25% by area—is applied by an entirely new cladding process—the controlled atomic weld. For complete information on Alumoweld Strand, write for Engineering Bulletin E.D. 3000.

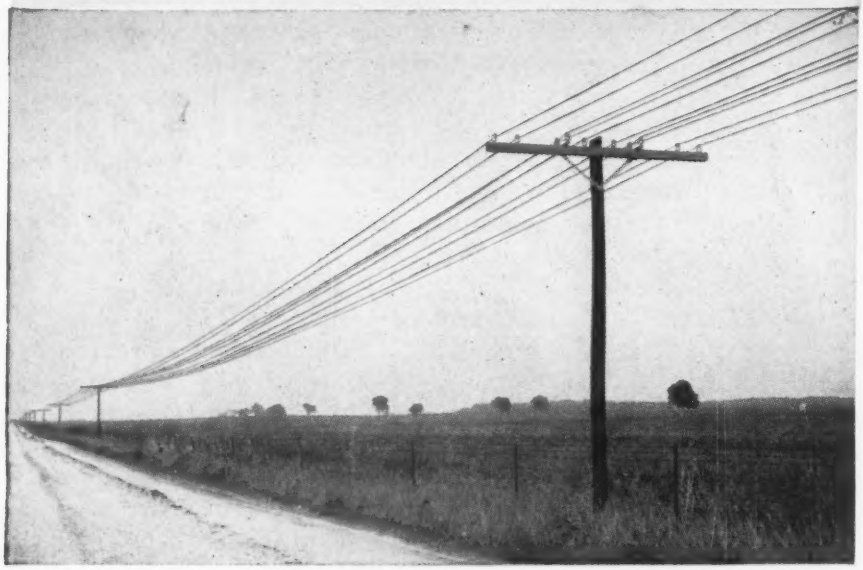
Crapo HTL-135

High Tensile Line Wire

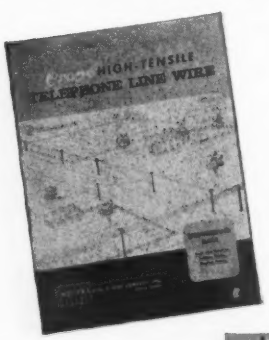
MADE TO WITHSTAND HEAVY STORM LOADS

Time and time again, *Crapo* HTL-135 has demonstrated its ability to stand up under heavy ice and wind loads when other conductors failed. This can be attributed to the fact that *Crapo* HTL-135 combines high strength with high fatigue endurance plus superior elastic qualities which enable it to spring back into place when loads are removed. The result: service interruptions are minimized, re-sagging is seldom necessary, where this rugged telephone wire is used.

The excellent telephonic transmission characteristics of *Crapo* HTL-135 make practical subscriber loops of 14 to 15 miles with normal voltages and equipment. Longer loops are possible where higher voltages and more sensitive telephone sets are employed. For dependable, long-span, low cost rural lines, specify *Crapo* HTL-135.



HERE'S PROOF OF DEPENDABILITY



The **Crapo** HTL-135 in this typical rural line of 300-foot spans was subjected to two heavy ice storms within 14 months. This photo shows the line, without resagging, three months after the second storm.

Write for Manual TM-59 containing complete engineering data!

Crapo HTL-135
INDIANA STEEL & WIRE CO., INC. MUNCIE, INDIANA U.S.A.

INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

coming

CONVENTIONS

MILITARY ELECTRONICS CONVENTION, Biltmore Hotel, Los Angeles, Calif., Feb. 1, 2, 3, 1961.

LOUISIANA Tel. Assoc., Captain Shreve Hotel, Shreveport, La., Feb. 15-17, 1961.

MINNESOTA Tel. Assoc., Radison Hotel, Minn., Minn., Feb. 19-22, 1961.

KENTUCKY Tel. Assoc., Phoenix Hotel, Lexington, Ky., March 7, 1961.

TEXAS Tel. Assoc., Rice Hotel, Houston, Texas, March 12-14, 1961.

IOWA Tel. Assoc., Savery Hotel, Des Moines, Iowa, March 23-24, 1961.

INTERNATIONAL POLYTECHNIC SYMPOSIA, Auditorium of the Engineering Societies, New York City, April 4-6, 1961.

NEBRASKA Tel. Assoc., Cornhusker Hotel, Lincoln, Nebraska, April 5-6, 1961.

OHIO Tel. Assoc., Deshler Hilton Hotel, Columbus, Ohio, April 18-19, 1961.

ILLINOIS Tel. Assoc., Pere Marquette Hotel, Peoria, Ill., May 17-19, 1961.

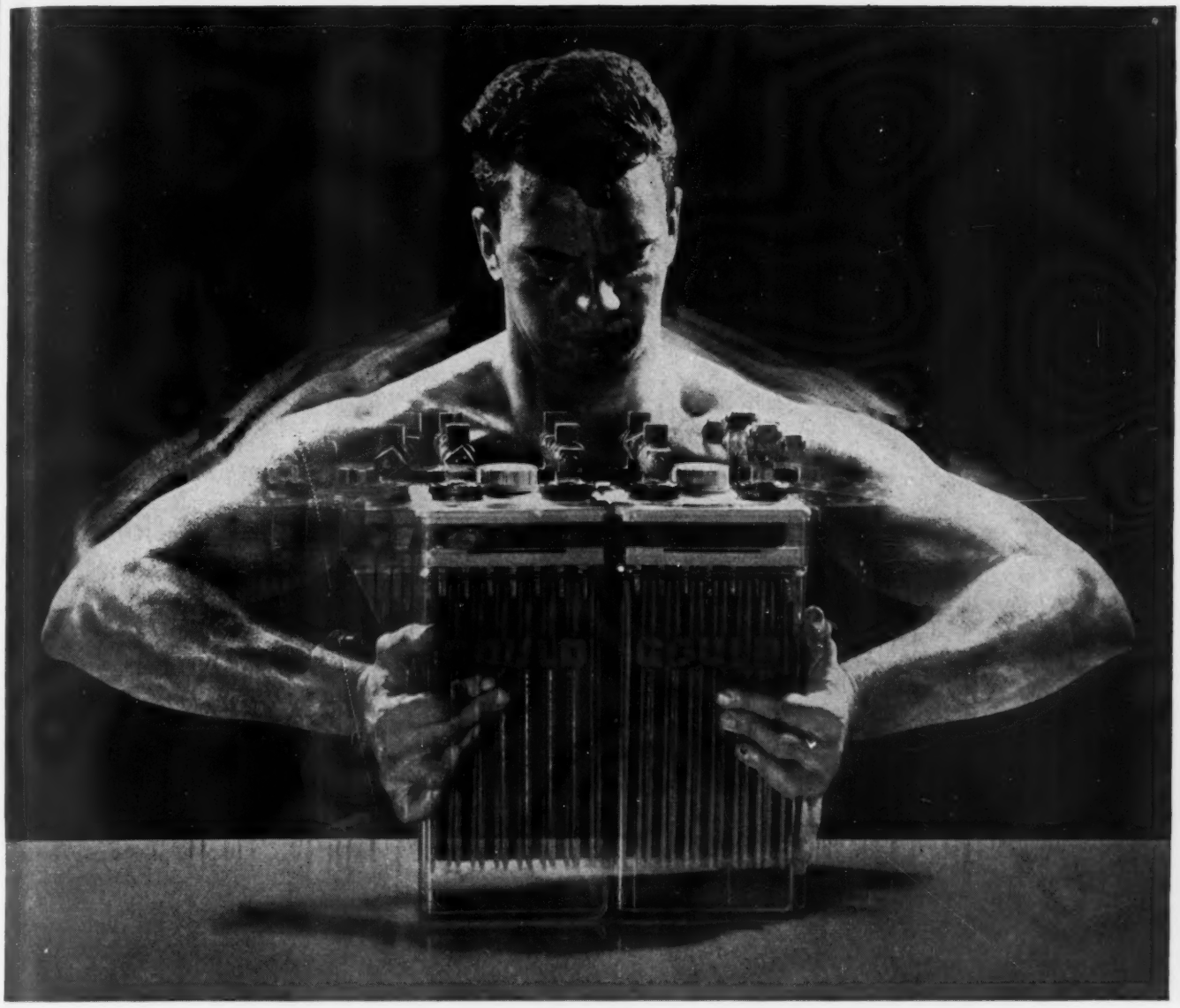
KANSAS-MISSOURI Tel. Association, Continental Hotel, Kansas City, Mo., May 22-23, 1961.

PENNSYLVANIA Tel. Assoc., Poco Manor Inn, Poco Manor, Pa., June 5-7, 1961.

WASHINGTON-OREGON Tel. Assoc., Empress Hotel, Victoria, B. C., June 15-16, 1961.

NEW YORK Tel. Assoc., Scaroon Manor, Schroon Lake, N. Y., June 19-21, 1961.

CALIFORNIA Tel. Assoc., Hawaiian Village, Honolulu, Hawaii, June 26-30, 1961.



Now—Gould Stationary Batteries in Plastrite Jars resist more impact than ever without damage!

They are unharmed by normal handling shocks and shipping abuse because of the high tensile strength of new lightweight Plastrite Jars—a tensile strength greater than other Stationary Battery jars.

Withstand heat without damage. Gould's new Stationary Batteries in Plastrite Jars will not warp, bulge, or lose shape. The Plastrite Jars have 50% higher elongation characteristics, 15-30% higher resistance to heat distortion than other stationary battery jars.

Same capacity, smaller size. Gould Stationary Batteries in Plastrite Jars save you 30-40% floor space . . . give you the same capacity in a smaller size battery. They are available in Planté, Calcium, and Kathanode. For more details, write today or call your local Gould Office listed "Batteries-Industrial" in the yellow pages. Gould-National Batteries, Inc., Trenton 7, New Jersey. In Canada, write to Gould-National Batteries of Canada, Ltd., 1819 Yonge Street, Toronto, Ontario.

New Stationary Batteries in Plastrite Jars offer the same long life for which Gould has always been famous

More Power to you from **GOULD**

- **Will existing toll settlement agreements become museum pieces?**
- **Are we neglecting a tremendous source of untapped revenue?**
- **Indium should feel right at home in telephone circles.**
- **Did the 1960 election produce one innovation that is more dangerous than enemy attacks?**

INDUSTRY OBSERVATIONS by L. A. GRITTEN

W. A. T. S.

INDEPENDENTS begin to feel the impact of the telecommunications renaissance. The stated objectives of the Bell System include flat rates for toll service over very large areas, possibly the entire country; the elimination of the present distinction between local and long distance services; and world communication by space satellites that are expected to carry a far greater volume of traffic at a much lower cost.

A recent U.S.I.T.A. letter states that *Wide Area Telephone Service* tariffs will be filed for interstate service this month, to be followed by intrastate filings in the near future.

For Independents this means in effect that existing toll settlement agreements will shortly become museum pieces. If Independents are to survive, the basis of compensation for service beyond their exchange areas must be drastically revised to keep in step with these modern developments.

Semper Fidel

ONE OF Fidel Castro's first stabs at the United States was the seizure of the Cuban Telephone Company. Not many of us in this industry can feel much liking for the fellow. Yet perhaps he is really trying to help us. At all events he has made us aware that we have neglected a tremendous source of untapped revenue.

In Fidel's Cuba, when you dial a number and wait for the called party to answer, the interval between ringbacks is not wasted, as with us. You hear such anti-American sentiments as "We will conquer the American capitalists," "We approve of the seizure of American-owned investments," and so forth.

Here is an advertising opportunity that will make our Yellow Pages turn light green with envy. Let us install the necessary gimmicks so that every ringing interval on every local call will carry a profitable advertisement, e.g.: Brrrrrrrr — "Your engine loves *Greasoline*. Stop that knock with *Greasoline*" . . . Brrrrrrrr — "Don't be too old at 90. Renew your youth with *Casanova Tabloids*" . . . Brrrrrrrr — "Keep your teeth bright and shiny. Park them every night in *Detergodent*."

There is advertising that you can sell to every business prospect at top rates, and the victims, excuse it please, we mean customers cannot possibly escape or evade it. It has everything! There's millions in it! Don't thank us, thank that nice Mr. Castro.

Indium

THE RAGING torrent of modern technology has swept yet another strange and unfamiliar metal into popular interest. It is not new but until recently it has been so extremely rare that most of us have known it, if at all, merely as a name in the list of elements.

It is Indium (In — Atomic weight 114.76 — Specific Gravity 7.3), a soft silvery, easily malleable element in the same group with boron, aluminum, gallium and thallium. Indium was discovered in 1863; but it is found in such minute quantities that it was not produced on a commercial scale until ninety years later.

Now Indium is becoming more plentiful and vastly more important. It is used in germanium transistors; for that purpose it is made into tiny spheres about .0008 inches in diameter; sixty-one of them could sit on the head of a pin. It is used in rectifiers; in high-speed long-life bearings; and in lubricants. It is valuable as an indicator in atomic reactors.

The Consolidated Mining and Smelter Company of Canada states that the indium they produce at Trail, B. C. is 99.999 per cent pure. It should feel right at home in telephone circles!

The Ultimate Glamor

ANYONE who can fiddle with a slide rule and discover that five times eight is 39.9 is now classed as an engineer. It is a blanket description. We have engineers of almost anything from garbage disposal to computers. It has fallen to the Bendix Corporation to add new luster to the title, with space advertisements calling for Satellite Communications Engineers.

There is real glamor, the highest, the most, the latest. What chance have talent scouts for less romantic occupations to outbid that attraction? The magic letters S C E on lapel or letterhead will make the ultimate appeal — until they set up a colony on Mars and start advertising for Planetary Flight Engineers.

Meanwhile, we had better keep a close eye on our younger and more impressionable telephone engineers. They may catch satellitis and escape!

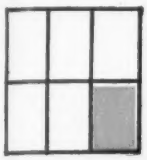
Debate Danger

THE 1960 election produced one innovation that is potentially more dangerous than enemy attacks, the televised debates between presidential candidates. Rulers selected by the choice of 50.1 per cent of the peo-

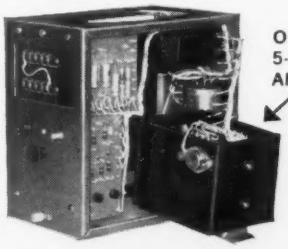
FIVE IDENTICAL PLUG-IN GENERATOR UNITS

Five interchangeable frequency generators—each complete with voltage regulator, oscillator, transformers, amplifiers, cut-off circuit. Each individually adjustable for both frequency and voltage. Frequencies stabilized against changes in input voltage, temperature, load.

Transistor circuits for long trouble-free life. No moving parts. No routine maintenance. Operates from 50-volt battery at extremely low drain.

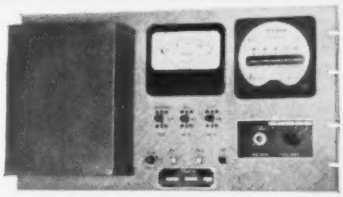


COMMON EQUIPMENT UNIT



Contains, for all frequencies: ample battery filter, remote control relay, audible ringing tone generator with (optional) 5-watt tone amplifier.

AUTOMATIC TRANSFER PANEL

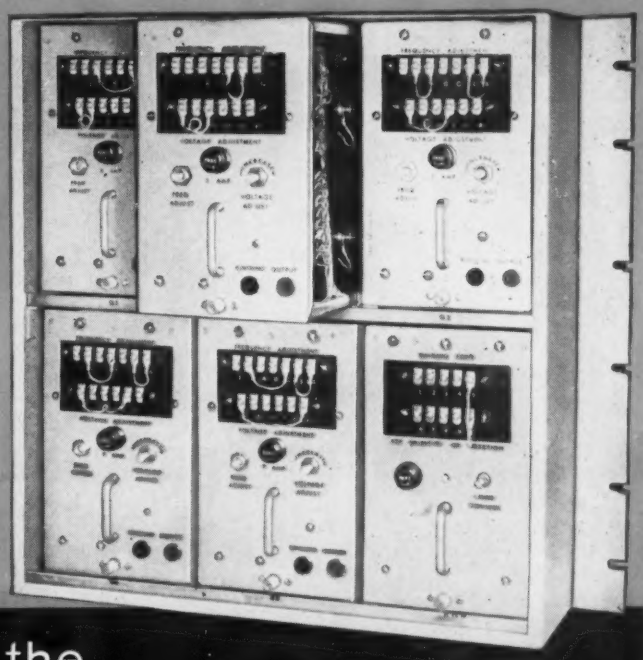


Connects two ringing machines together with either as the main machine, the other as standby. Load is automatically transferred to the standby and alarm is operated on partial or complete failure of the main. Manual transfer possible to check the standby. Either machine supplies load while other is metered for adjustment or tested with simulated ringing failure. Other panels available: portable, manual transfer and supervisory.

TWO MODELS
(Conservative ratings)
Model T: output 25 watts per frequency.
Fits 19″ rack, adapts to 23″ and 30″.
Takes only 17½″ vertical rack space.
Model T50: output 50 watts per frequency.

Write for Bulletin 177A

NEW!



front cover removed

the ideal ringing machine...
THE TRANSISTOR-TYPE
SUB-CYCLE®

★ **ADJUSTS TO ANY FIVE FREQUENCIES** from 15 to 66-2/3 cycles. Screwdriver adjusts any generator unit to new setting in as little as two minutes.

★ **SELF-PROTECTING** when ringing into a short circuit.

★ **SINE-WAVE OUTPUT** ...the ideal ringing power.

★ **AUDIBLE RINGING TONE** Separate generator for 420/40 cycles.

THE ONLY COMPLETE LINE OF POWER EQUIPMENT FOR COMMUNICATIONS

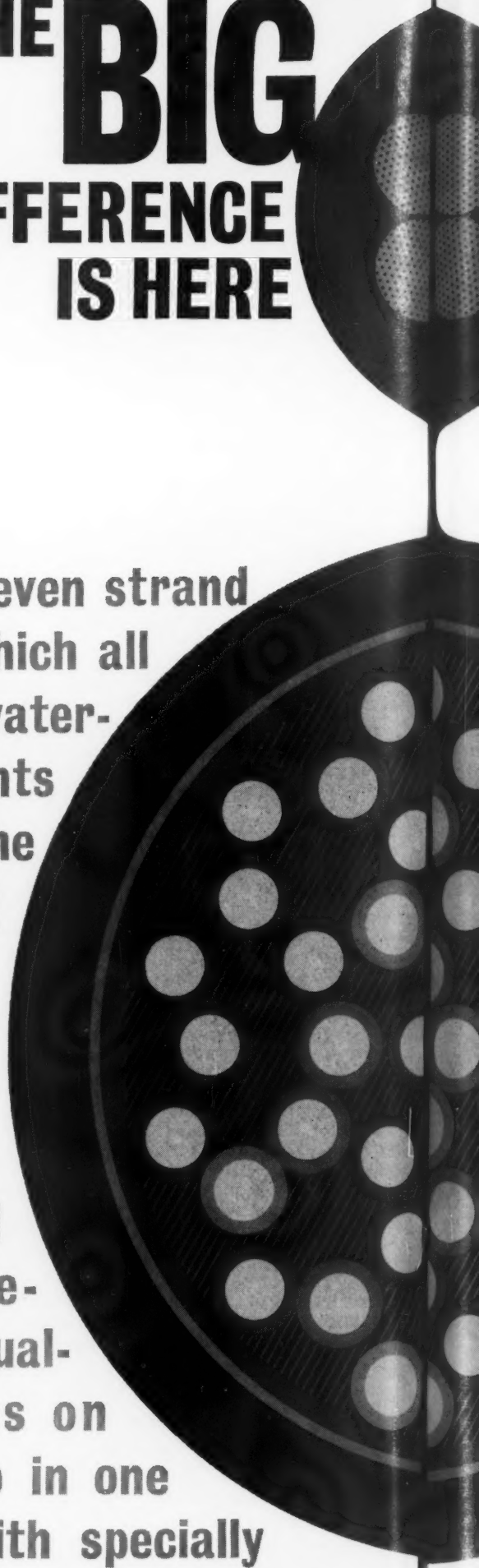
our equipment is sold through leading telephone distributors

FLOTROL® SUB-CYCLE®

LORAIN *Products Corporation*

1122 F Street Lorain, Ohio Phone: ATlantic 8-9191

THE BIG DIFFERENCE IS HERE



Sealed messenger strand: a seven strand galvanized steel support in which all interstices are filled with a water-proofing compound. This prevents water from entering between the support strand and overlying jacket, thereby minimizing strand corrosion. **Seven wire support strand:** linemen are accustomed to handling a seven wire steel strand...no special techniques or hardware required. **Economical:** Figure 8 Qualpeth Exchange Cable saves on installation costs...it goes up in one operation instead of three with specially

GENERAL CABLE FIGURE 8 MESSENGER SUPPORTED QUALPETH EXCHANGE CABLE

designed tangent supports for faster, easier stringing. Buy and install General Cable Figure 8 Qualpeth Exchange Cable, designed and manufactured for the Independent Telephone Systems of America. General Cable Corporation, 730 Third Avenue, New York 17, New York. Distributed by: Automatic Electric Sales Corporation, Northlake, Illinois; Leich Sales Corporation, 427 W. Randolph St., Chicago 6, Illinois.

GCC

GENERAL CABLE CORPORATION

KLEIN KORD NYLON SAFETY STRAPS

WITH THESE FEATURES

Klein developed the first fabric safety strap and have pioneered in every development. The recently introduced Klein-Kord Nylon Safety Strap offers these features:

LONGER LIFE—Superior construction, woven from filament nylon. Stretch has been almost eliminated.

PLY ADHESION—The multiple plies of strongly woven pre-dipped nylon are frictionized in neoprene and vulcanized.

FLEXIBILITY—Klein-Kord Nylon Safety Straps are extremely flexible and assure maximum comfort and greater strength. When tested in use, these straps are capable of a test load of 2750 pounds, far in excess of any load they will be called upon to support in service.

QUALITY HARDWARE—All buckles and snaps are drop-forged and tested by Klein in their own forge shop.

WRITE FOR BULLETIN 560

ASK YOUR SUPPLIER

Foreign Distributor:
International Standard Electric Corp., New York

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
INCORPORATED
7200 McCORMICK ROAD, CHICAGO 45, ILL.

(Concluded from page 10)

ple are probably better than dictators; but their evaluation by several millions of inexpert judges, on the basis of how well they perform in a debate, is another matter. We illustrate from a personal experience:

Some years ago I was one of a debating team of three persons. By the toss of a coin, much to our dislike we drew the worst side of a thorny subject; we had to attack the freedom of the press. That should have made our defeat certain; but we won the contest because we knew more about the strategy and tactics of debate than the other team. Yet not one of us believed in our own arguments.

The following day a friend talked to the three of us. He was a financial man, a dealer in facts and figures, who should have known better. He said: "You fellows have entirely changed my thinking about the freedom of the press; I believe you are right." His chagrin was pitiable when we explained that he had been swayed by a wholly meretricious and insincere presentation.

That may apply in the wider field of national elections. If we are to be governed in the future by the smartest debaters, Heaven help us!

Dumb Or Careless?

WE STOPPED to telephone at a service station in a little Montana city. It was one of those coin-box phones where you dial first and do not deposit your dime until the called party answers. The coin slots were covered with a hinged flap that told you in big type to read the instructions before placing your money. The instructions were clear, brief and explicit. There was not the slightest excuse for prematurely depositing and thereby losing your dime.

The manager came over. "Just want to make sure you know how to work that thing." We assured him we did. "That's good," he said. "We get dozens of people, tourists mostly, who put their money in first and then howl their heads off to us because they don't get their call or their money back."

As every American freely admits, we are a very literate and sensible people, with a flair for things mechanical. Then why?

Mithras Returns?

RECENTLY compiled bibliography on the harnessing of solar energy comes from O.T.S. (SB 418, Solar Energy Applications, 10 cents — Publications Division, Office of Technical Services, U. S. Dept. of Commerce).

Five years ago, when the first solar-powered telephone call was placed by a Georgia farmer, the man in the street regarded it as an interesting novelty and little more. Today, satellites in space repeat their vital messages indefatigably and reliably, operated by the rays of the sun. From that to sun-powered space ships is merely a few more steps in the march of science.

Imagination feasts on the development of atomic reactors; but in the long run the solar battery — a Bell Laboratory product — may prove as valuable to civilization as the more spectacular achievement of the atom splitters.

At Christmas Time

ONE bad thing about being a telephone man is that one tends to assay every event and every period in terms of its communications. At Christmas time, for instance. In the simple days of the first Christmas, their speed of communication was that of transportation, seldom more. True, there were a few primitive semaphores and hill-to-hill signalling devices; but generally speaking messages were carried no faster than men could walk, horses could trot or ships could sail.

The amazing thing is that there was no improvement for 1800 years. Caesar Augustus, Pontius Pilate and Herod enjoyed better communications than George Washington or Benjamin Franklin, if only because they commanded more and better disciplined messengers.

Nothing in our own amazing times has been more important than the sudden acceleration of modern communication, for every other advance has depended upon that.

To you and yours, a Merry Christmas! — *L. A. Gritten.*

ACHIEVERFONE

designed for tomorrow —available today!

Within the next few years, the use of common carrier radio telephones will double — perhaps even triple! However, as traffic increases, many existing types of mobile phones with only one or two frequencies will become obsolete.

AC considered this when designing their 150 Mc mobile radiotelephone . . . the AChieverfone. The result was not one or two frequencies, but four frequencies which are selected by easy-to-operate pushbuttons on the control head. This means that with a four channel AChieverfone there is no waiting for a channel to clear, no relayed messages, no call-backs . . . your customers can call, or receive calls from, any telephone in the world — whenever they wish!

Feature for feature, AChieverfone is the best common carrier MRC system available. It costs less, takes less time to install and is compatible with all existing equipment. It will pay you to buy Achieverfone.

SPECIFICATIONS—FCC Type Accepted

Transmitter: 144-174 Mc, 4 channel

RF output: 22.5 watts into 52 ohm load

Receiver: 144-174 Mc, 4 channel

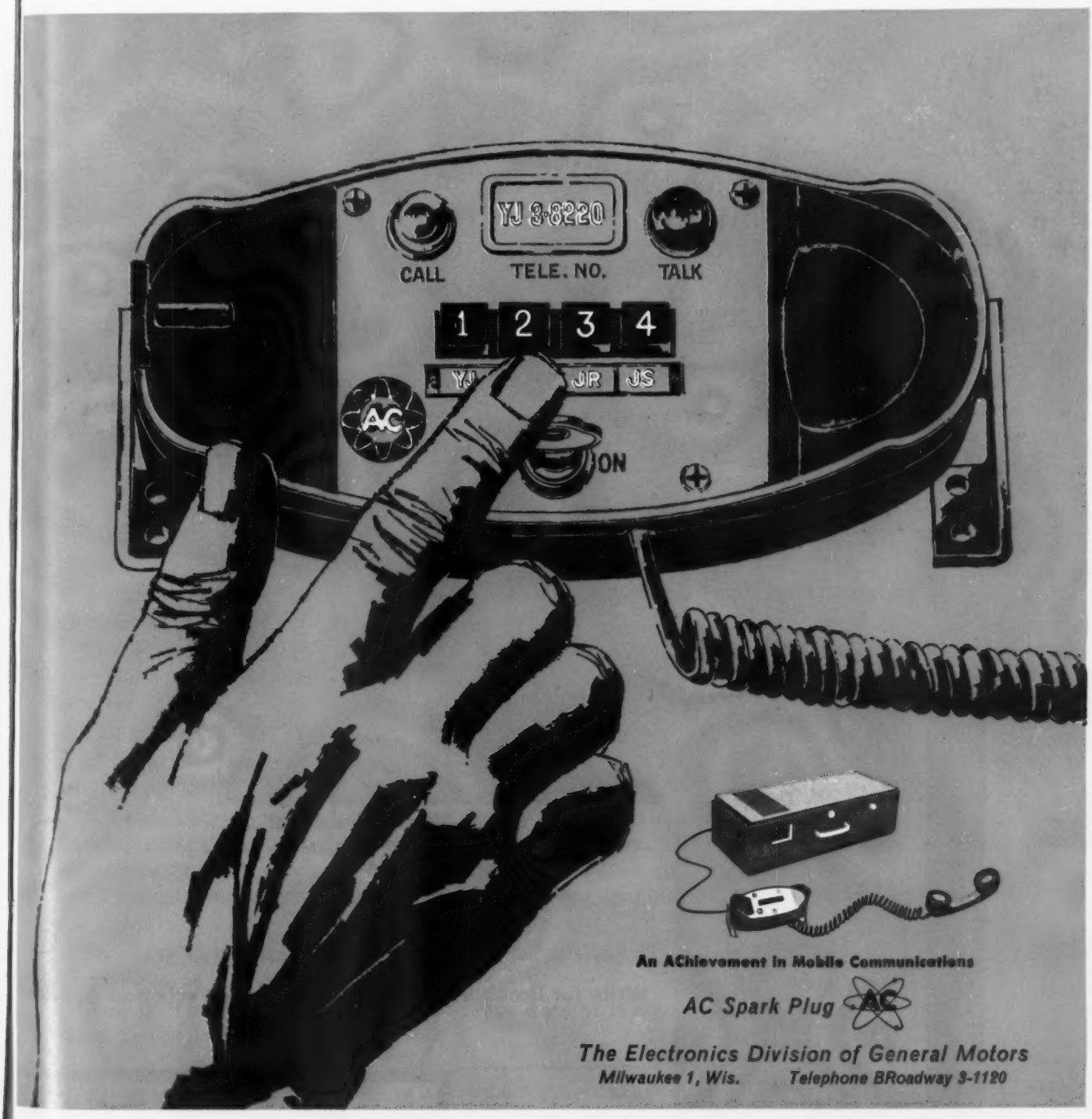
Wide Band (60 kc) or Narrow Band (30 kc) models available (Wide Band quickly converted to narrow by substituting IF filter)

Frequency Stability; within 0.0005%

Selective Signaling; 51,000 five-digit (compatible, 2-tone sequential) codes available

Size: Receiver-Transmitter, 21 1/16" x 8 7/8" x 6 1/4"

Weight: 35.5 pounds, including receiver-transmitter, control head and cable



An AChievement in Mobile Communications

AC Spark Plug

The Electronics Division of General Motors

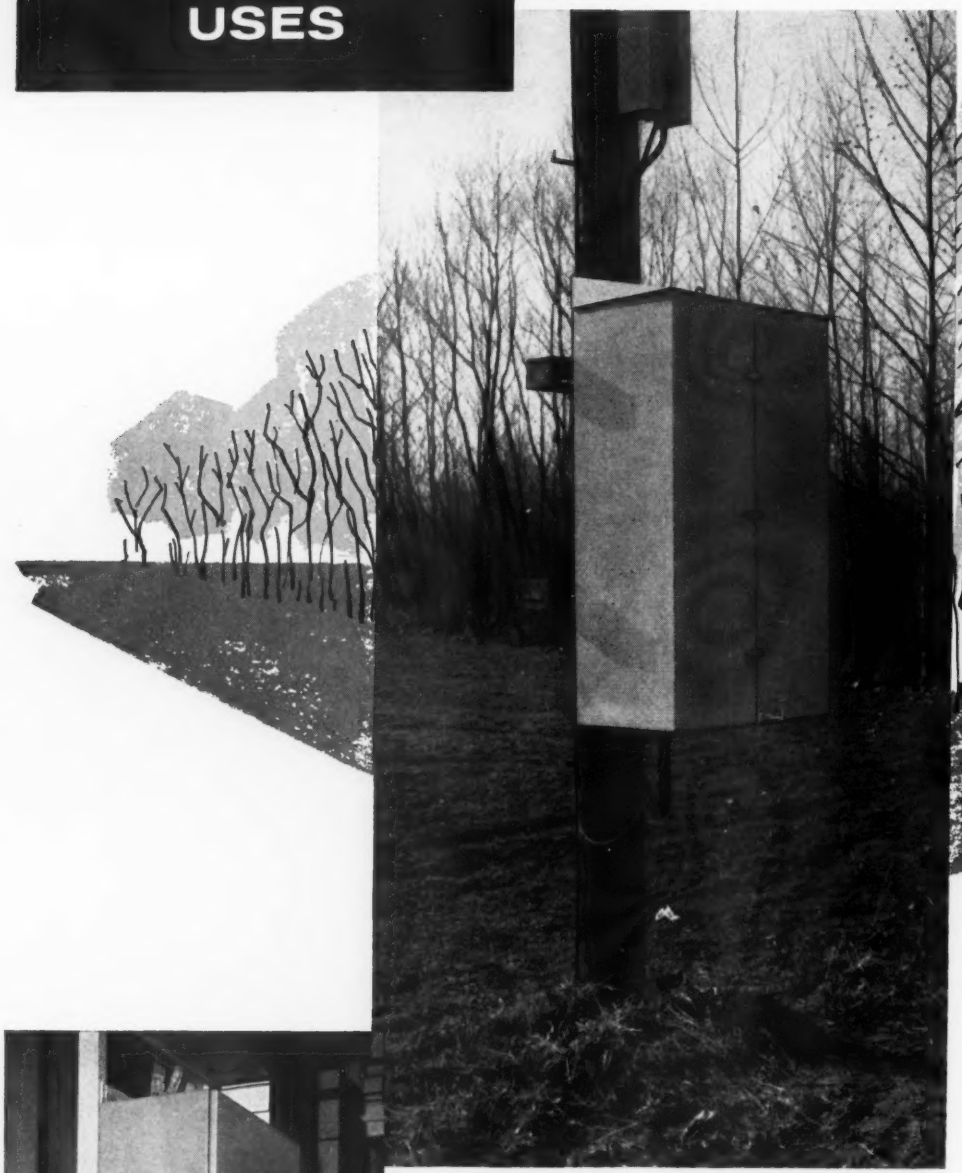
Milwaukee 1, Wis. Telephone BRoadway 3-1120

LEICH

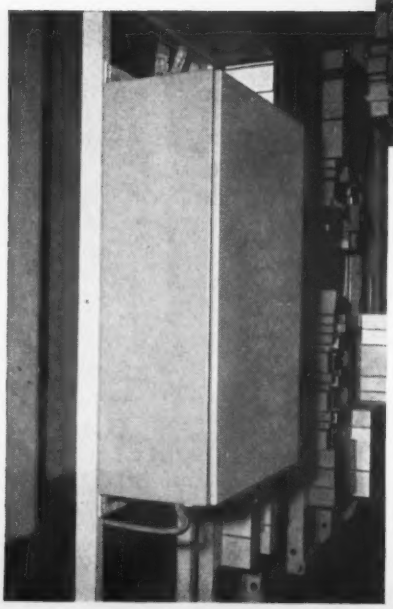
LINE CONCENTRATOR

PROFITABLE USES

Serve



SUBSCRIBER UNIT



EXCHANGE UNIT

Write for Brochure of Line Concentrator Facts and Applicati

LEICH

Subsidiary of

GENERAL TELEPHONE & ELECTRONIC

ewo Trailer Parks at Low Cost

Imagine! A unit that served two new trailer parks with a small investment in outside plant.

That's exactly what Leich's Line Concentrator did. Instead of serving each line over a separate wire pair, it concentrates a number of subscriber lines over a much smaller "high usage" trunk group.

The cost-cutting story: Every pair of the 51 pair cable going past the proposed trailer parks was in use. As soon as the trailer parks were finished, subscribers would need service.

A Leich Line Concentrator was installed quickly. As the cement for the trailer parking stands was poured, underground cable was placed and terminated in cross-connecting boxes in which the 49 Concentrator lines appeared. This flexible arrangement permits line assignments to be changed without opening the Line Concentrator cabinet.

The Line Concentrator used 11 pair of the existing 51 pair cable to furnish 49 lines — for a net gain of 38.

Benefits from the Concentrator: 38 more lines at low cost, plus quick revenue from new subscribers.

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

PACIFIC COAST: 11401 W. PICO BLVD., LOS ANGELES 64, CAL.

SOUTHWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS

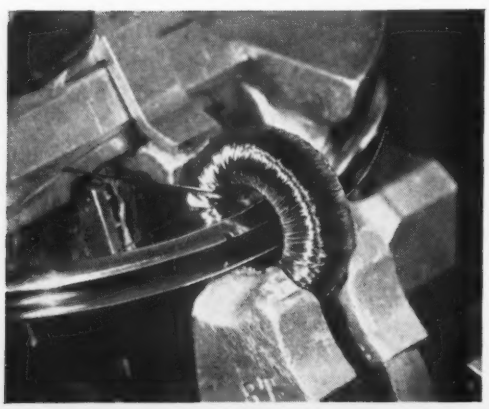
EAST: 3651 CONNECTICUT AVENUE, YOUNGSTOWN, OHIO

SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA

manufacturers of telephones, switchboards and related apparatus since 1907

Why you get more from LENKURT carrier

Automatic winding and grading of



The heart of any frequency-division system lies in its filters, and the success of the filters is highly dependent on the ability of their toroidal chokes and transformers to sharply define a precise frequency spectrum.

Because coils with a sufficiently high degree of uniform tolerance just weren't on the market, Lenkurt has always manufactured its own . . . individually winding each coil to exact electrical specifications. To meet the growing demand for Lenkurt equipment (and the need for toroidal coils), Lenkurt has developed and built unique automatic machinery for toroid fabrication.

Lenkurt coils assure you precise transmission

This "Carousel" produces more than 2100 coils a day. It performs every step in the fabrication, from molding the cores and measuring their individual characteristics to calculating and counting turns of wire . . . compensating for core variations with no chance for human error. It then automatically tests the performance of the finished units. Such automation assures fullest use of frequencies within each channel unit of Lenkurt carrier systems.

This is an example of the advanced thinking and planning that go into all Lenkurt telecommunications products. They are engineered with *your* future in mind.

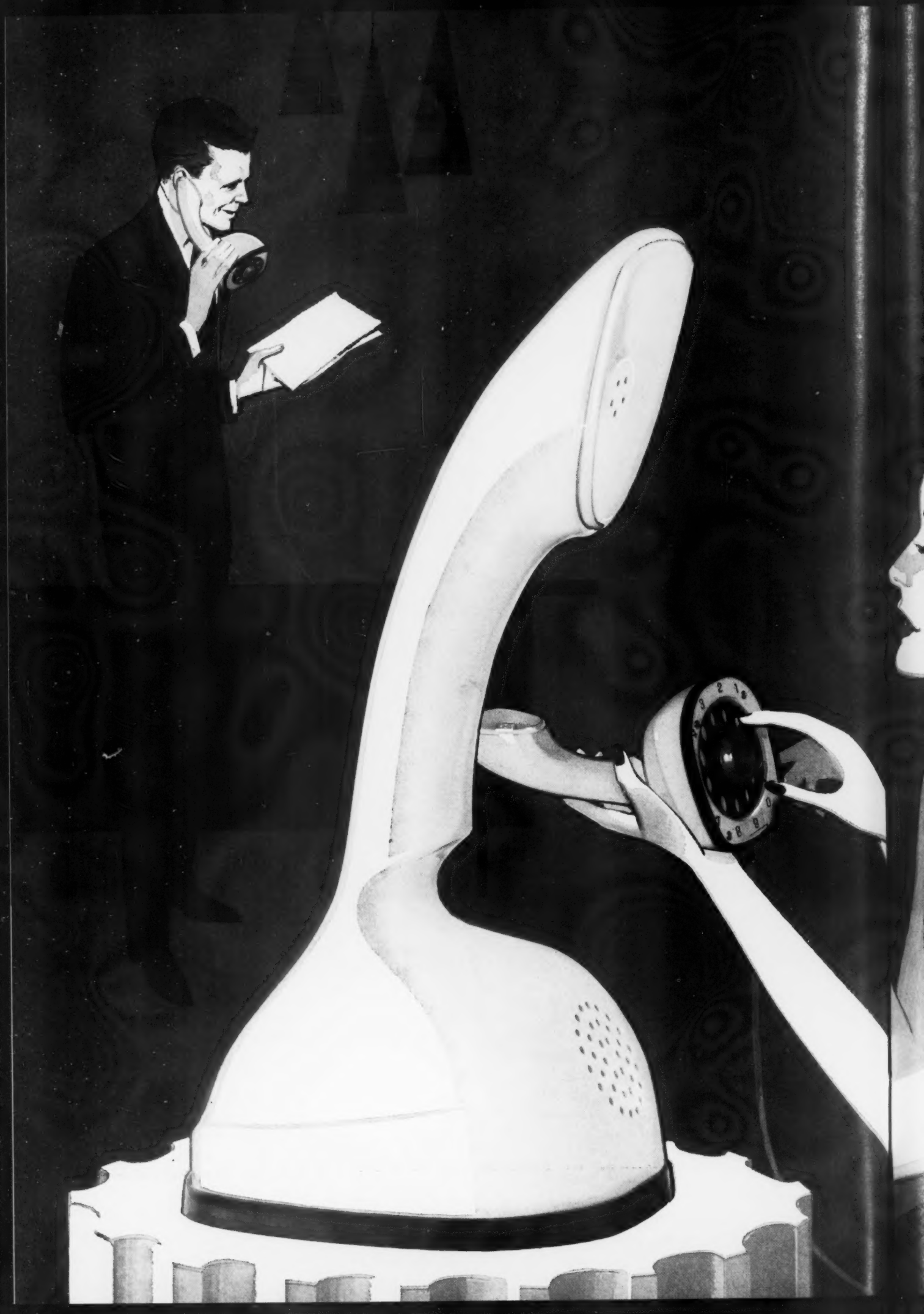
Before you spend a penny for additional circuits, ask your AE representative for more information on Lenkurt carrier for open wire, cable, or microwave. He can help you with system planning, too. Or contact the Director, Carrier & Radio Sales, at Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM



NORTH ERICOFON proven and accepted as the finest telephone in the world

In October, 1956, North introduced the Ericofon to the Telephone Industry. Today, three years later, the Ericofon is offered as a standard telephone instrument by hundreds of telephone companies.

The Ericofon was a proven instrument even before its introduction—proven in laboratory testing over a period of SIXTEEN years of development.

It remained only for the Ericofon to prove itself to YOU—and it has done that.

- The Ericofon has proven itself to be the most beautiful, most wanted telephone instrument in the world!
- The Ericofon has proven itself to be the most convenient telephone instrument to use!
- The Ericofon has proven itself to be the biggest single factor in building revenue increasing extension installations!
- The Ericofon has proven itself to be equal to any instrument in reception and transmission!

If you are not yet offering Ericofons to your subscribers—let the Ericofon PROVE ITSELF TO YOU—NOW. The finest telephone instrument in the world is the Ericofon. Ask any user.

The Ericofon is another product of

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

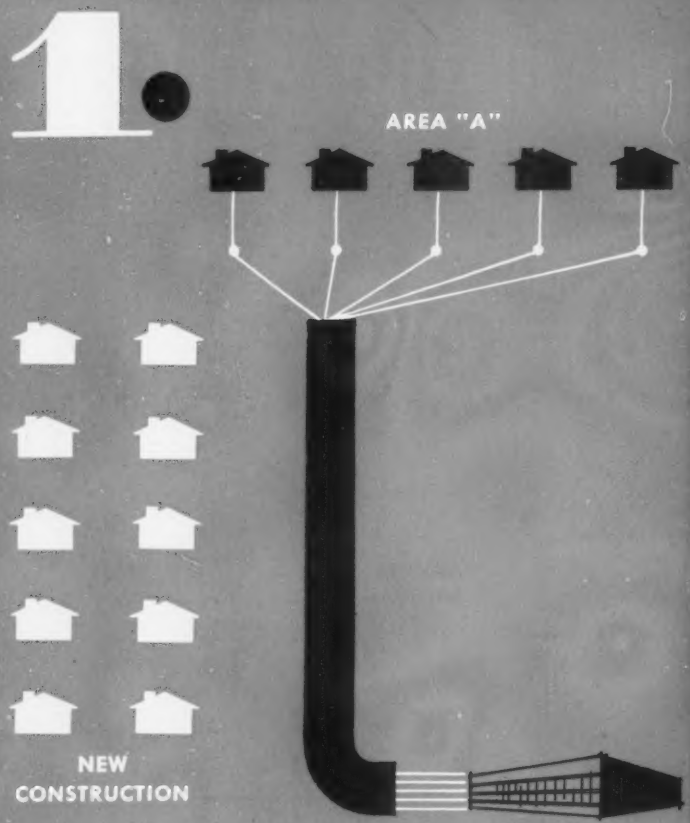
60-T-1

for greater profit...co

ITT KELLOGG LINC

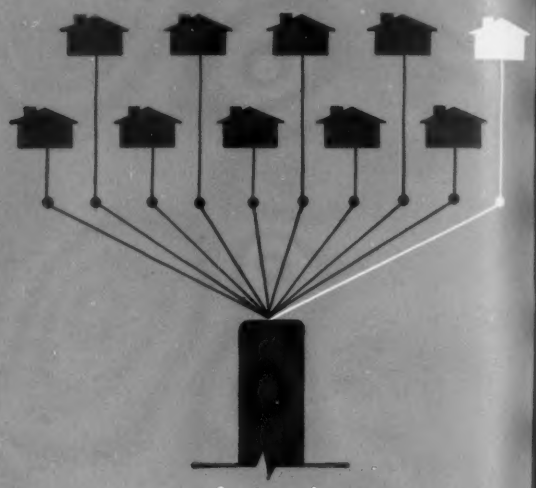
● *here's how it works*

1.



Typical situation . . .
A demand for upgraded and new service

2.



90% of the lines are idle!

Your cable pairs are in use less than 10% of the time

● *and it costs less tha mi*

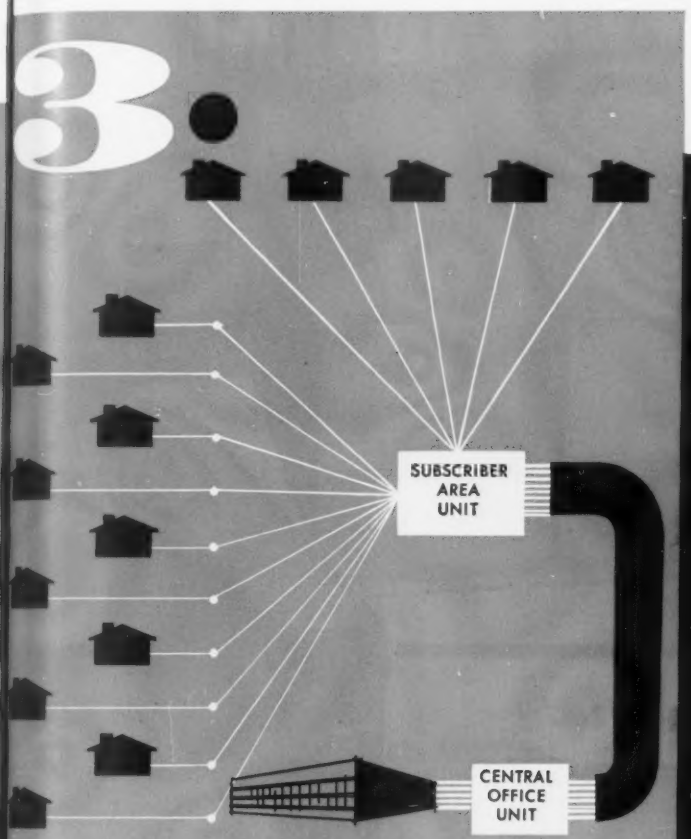
WHERE & WHEN TO USE A KELLOGG LINE CONCENTRATOR. Saves you the expense of installing new lines in a wide range of applications such as new suburban developments, resort areas, military installations, outlying plants, hotels, motels, trailer parks, county fair and other special event areas...The ITT Kellogg Line Concentrator is a low-cost, high-grade, permanent substitute for cable additions.

EASILY INSTALLED; ECONOMICAL. These electro-mechanical devices require *no* additional cable, *no* changes or modifications of *any* sort (except jumpering) in either central office or subscriber station equipment...can be installed and put into operation in a matter of days—by your own crew. Rapid amortization of investment. Available (from stock) in 2 basic models. Entire cost: *less* than the cost of a mile of 19 gauge, 26 pair cable!

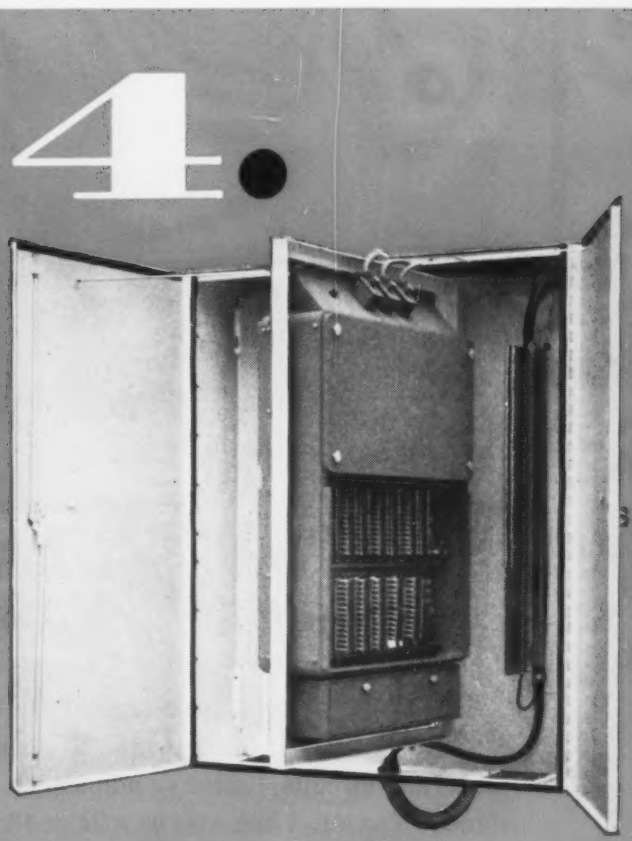
Concentrator systems, although relatively new in this country, have, for years, been successfully used in Europe. Kellogg, while fully utilizing the great technological advances achieved by European ITT experts in this field, has advanced and adapted concentrator systems to meet the requirements of the operating telephone industry of the United States.

Regional Offices and Warehouses: **CALIFORNIA:** 23 Broderick Road, Burlingame, California, OXford 7-5780. **GEORGIA:** 1594 Southland Circle, N. W., Atlanta 18, Ga., SYcamore 4-2441. **ILLINOIS:** 4600 So. Tripp Ave., Chicago 32, Illinois, CLiffside 4-4300.

...oncentrate with the ...CONCENTRATOR



The concentrator expands total service by sharing cable pairs. 52 lines are derived from 14 cable pairs or even 104 lines from 20 cable pairs.



Kellogg Line Concentrator performs all these operations without degrading service.

...a mile of 19 ga. 26 pair cable!

For complete details and technical information, or an appraisal of your needs, fill in the coupon at right.

ITT KELLOGG

A Division of
International Telephone & Telegraph Corporation
6650 South Cicero Avenue, Chicago 38, Ill.

Telephone and Transmission Dept.
2912 Wake Forest Road, Raleigh, N.C.

ITT Kellogg products available in Canada through Standard Telephones & Cables Mfg. Co. Ltd., 9600 St. Lawrence Boulevard, Montreal 12, P.Q., Canada

ITT Kellogg
Marketing Dept., 6650 South Cicero Avenue
Chicago 38, Illinois

- ☐ Please send me further details on your Line Concentrator
- ☐ Please arrange to have an engineer call to appraise our Concentrator needs

Name_____

Title_____

Company_____

Address_____

KANSAS: 7th & Sunshine Road, Kansas City 15, Kansas, MAyfair 1-4418. **NEW YORK:** 327 North West Street, Syracuse, N. Y., HArrison 2-9251. **TEXAS:** 1359 Motor St., Dallas 7, Texas, RIverside 7-5191. **EXPORT:** 4600 So. Tripp Ave., Chicago 32, Illinois, CLiffside 4-4300.

Norelco® INTRODUCES NEW NE-6 VOICE REPEATER

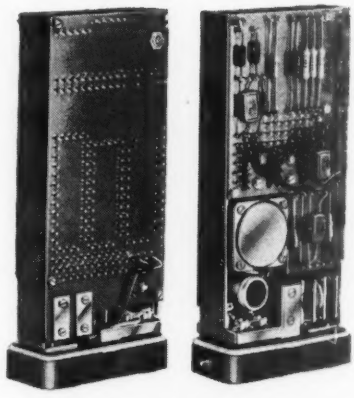
ALL IN ONE

The only **ALL IN ONE** *completely transistorized series-shunt repeater*

A COMPLETE UNIT, the Norelco NE-6 combines series and shunt repeaters with built-in network. It is suitable for both trunk and subscriber circuits, loaded or non-loaded. It can pass A.C. and D.C. signals. The NE-6 operates on a 24 or 48 volt central office battery, and each repeater requires only 15 ma. A standard nine foot rack holds 180 repeaters. Modern plug-in type construction permits the repeater to be removed from the line without interrupting the circuit.

Check these important features:

1. Suited for loaded or non-loaded facilities.
2. Operational gains:
   Intermediate Repeater: 17 db
   Terminal Repeater: 8 db
3. Compatible with A.C. and D.C. signalling.
4. Operates on central office battery, 24 or 48 volts ±30%.
5. Compact, airtight plug-in construction.
6. High quality components.
7. Quick and easy to install.



The simple strapping panel on one side of the repeater allows quick and easy network balancing by interconnection of soldering pins which are clearly marked with element values.

For full details contact your local distributor or:

NORTH AMERICAN PHILIPS COMPANY, INC. TELEPHONE PRODUCTS AND SYSTEMS DEPARTMENT
100 EAST 42nd STREET, NEW YORK 17, NEW YORK

Part One of A
Special TE&M Report

REGULATION AND "PUBLIC INTEREST"

A JOINT RESPONSIBILITY

Regulated industry plays a key role in the grim struggle the U. S. economy faces today, and the outcome depends on the ever-improving performance of our private economy, in production, efficiency, and employment.

By JOSEPH J. BROWN*

IN A LANGUAGE as fluid as English, it is interesting to not the stability of the term "public interest." The words carry enough vigor and appeal to get almost daily political use. Yet they seem highly resistant to wear, for their usage reaches far into the past.

Any study of regulation must focus on the "public interest," for a regulated company has been defined by law as "affected with the public interest" ever since the expression was used 83 years ago in the celebrated case of Munn v. Illinois. In writing the Supreme Court decision on that case, Chief Justice Waite reached back 200 years for the term to an obscure case involving public wharves in London.

Actually, this definition carried a misleading air of simplicity. Banking, steel, housing and a number of non-regulated businesses vitally affect the public interest. In fact, all business affects the public interest. Only the degree varies.

Degree of Public Interest

LET us examine for a moment the degree of public interest in regulated industry today.

The regulated transportation, communications and public utility companies provide services that affect the efficiency of every business and comfort of every home. These services are essential to the proper functioning of our whole economic and social structure.

As an integral and essential part of the American economy, regulated industry plays a key role in the grim struggle our economy faces today. In recent years foreign sewing machines, typewriters, automobiles, barbed wire, cameras, fabrics and many other products in rising volume have entered American markets to compete with our own products. The outcome of this competition will affect the prosperity and living standards of all Americans.

This, however, is a small stake compared with that involved in the present struggle between the economies of Russia and this country. Russia boasts of swift growth in production. Her leaders even predict the date when her economy will overtake ours. In this struggle, the stakes are ideological if not actual life or death. And the outcome depends on the ever-improving performance of our private economy, in production, efficiency and employment.

The Importance of Regulated Industries

IT SEEMS to me it is high time to recognize the importance of our regulated industries in this struggle. Their growth is essential to the growth of other parts of the economy. But their significance goes beyond this. A quarter of all American corporate capital is invested in regulated industry, which provides jobs for four million people, pays seven billion dollars in annual taxes, and has three million shareowners.

Mr. Brown is Chairman of the Nebraska State Railway Commission.

The spending of regulated industry for growth and improvement amounts to many billions, affecting the prosperity of many non-regulated companies. More than a third of all the capital spending by business for plant and equipment in 1958 was done by regulated companies.

Clearly, any disease in this portion of the economy would reduce the vigor of other portions as we struggle against foreign challenges. And it would impair our defense, to which the services of regulated industry are basic.

This suggests that the importance of intelligent regulation was never greater than it is today. And I firmly believe this. In considering individual cases it is vital that these larger issues be kept in mind. The stakes are too great to allow any other approach. This is a time for every portion of American business, including regulated companies and those who regulate them, to strive for the greatest possible success.

A Joint Responsibility

THE responsibility for this success is joint in regulated industry. Neither the manager nor the regulator can wash his hands of this responsibility. Nor should he wish to. It must be shared.

It seems to me that there are several aspects of this joint responsibility that merit discussion here. **The first responsibility of management and regulators is of course to see that high quality of service is available to all, at attractive prices.**

The vital importance of this is obvious when one considers the impact of failure to accomplish it. When Portsmouth, Ohio, was without telephone service for 61 days it was a tragic demonstration of how dependent a community is on this service. Deaths occurred because doctors could not be reached. Business declined. And people lived in constant tension, fearing fire, crime or sudden illness.

While this failure certainly cannot be attributed to regulation, but perhaps to a combination of management, labor and the police authorities, it clearly illustrates the importance of availability of service.

A second aspect of the responsibility of regulators and management is work for the long term interest of the public. The only way the public interest can be accurately viewed is in terms of the long run. Occasionally someone tries to equate the public interest with some short-term advantage. This is a grave disservice to everyone if there is any sacrifice of long run public benefits.

For example, many years ago it became apparent that eventually it would be necessary to place telephone wires underground in large cities. From the moment when this was known, it was clearly not in the public interest to place more wires overhead, which would later have to be removed and installed underground. Any decision by management to do this would surely raise the long run cost of telephone service, although aerial installations might be cheaper in the short run. And any regulator who refused to allow enough elbow room in telephone earnings so management could prudently go ahead with underground installations was also seeking a short term advantage at the sacrifice of the long term public interest.

Regulators see companies in widely varying states of wealth come before them, and in my 19 years in regulation, I have rarely seen a really distressed company make any unusual strides in serving the public. Recognizing this, some state commissions try to help or get help for distressed companies, in financing, technical advice and other ways.

A third aspect of the joint responsibility of management and regulators is to seek continual improvement. This nation must have improvement — in production, products and employment — if it is to meet the challenge from overseas, take care of its growing population, and attain higher living standards.

In this setting, the standards of the past will not do. In fact, if everyone had always accepted past standards as "good enough" we would still be living in caves. Imagine what it would be like if there had been no improvement in transportation, in communication, in the wide choice of services and products available to us today. The new convenient types of service now coming on the market would be removed. This would be inconceivable in view of the public needs of today and tomorrow.

"This is a time for every portion of American business, including regulated companies, and those who regulate them to strive for the greatest possible success."

A fourth aspect is the requirement for prompt action when action is needed. This is also vital to the public interest. A management which fails to act with the greatest dispatch to restore service after a failure is subject to severe public censure, and very properly so. The public has a right to expect prompt decision and action in any emergency affecting service.

On a different time scale, the public has the same right to expect a commission to take prompt action on questions of company earnings, which affect the company's ability to provide service. Complex questions, requiring careful study, are involved. Yet the decision should not be unduly delayed.

This matter has received much attention in recent years. Commissioner Alan S. Boyd of the Civil Aeronautics Board calls delay the Achilles' heel of regulation. Other regulators have voiced the same idea. Yet the rate case is actually easier to complete than in years past.

Accounting practices have advanced so it is easier

to get at the facts today. Depreciation, nearly non-existent some years back, has been defined and measured. The SEC has removed the need to search for improper securities procedures. Former loose practices in assigning costs to expense and capital have been eliminated.

All this is clear evidence that regulation is doing its job, and doing it well. Some regulators, it seems to me, fail to recognize the extent of their own success. Today there is less need to engage in a long-time consuming hunt for the abuses which regulation itself has eliminated.

"Regulation of Human Activities"

SPENCER B. EDDY, former member of the New York Commission, said recently that regulation has gotten too technical. Whether this is true or not, it seems to me that in our study of the dollar amount of the rate base and the percentage of return, we must not get so preoccupied that we overlook the fact that we are regulating human activities. The purpose of every regulatory decision lies not in law or accounting, but in directing the course of a human activity which serves everyone.

To make this activity most successful, constant cooperative effort by manager and regulators is required. They must work together to solve problems, not turn problems into bones of contention. This is not an easy thing to do. The very mechanics of regulation tend to cast the manager and the regulator in the roles of adversaries.

Yet management must make continuing efforts to inform regulators fully and promptly of trends and changes in the business, so regulators may act with intelligence. Regulation cannot possibly work well if managers, motivated by fear or suspicion, keep regulators in the dark. The initiative in this must be taken by management, for it is management which first sees change occurring.

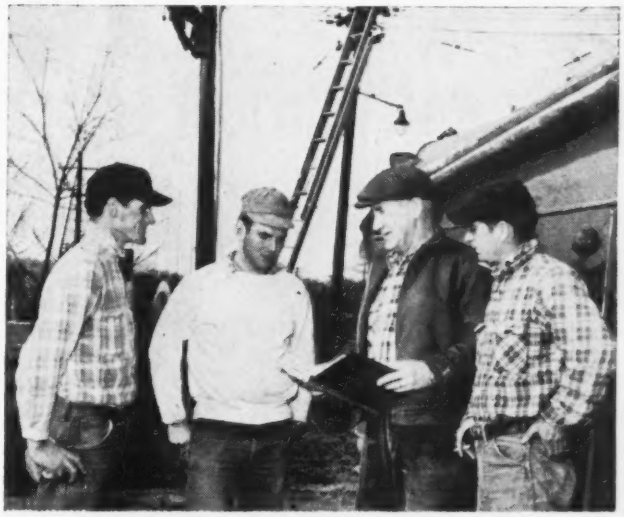
This can be done only if regulators encourage it, welcoming the opportunity to inform themselves so they may properly evaluate the nature and effect of changing trends.

"Regulation cannot possibly work well if managers, motivated by fear or suspicion, keep regulators in the dark. Management must make continuing efforts to inform regulators of trends and changes in the business . . ."

The cooperative nature of this effort places the highest premium on the quality of the men concerned. Management must continually work to develop leaders of stature, intelligence and integrity.

And regulators should have enough tenure and compensation so men of high quality are attracted. After induction they should have adequate instruction to familiarize them with the broad nature of the industries they regulate.

I have emphasized the need for improving human performance, for human performance is the most important element in providing good service, and in regulating public service companies. We need the very best men available. We cannot justify charging the customer for inefficient human performance.



"Human performance is the most important element in providing good service . . . We need the best men available. We cannot justify charging the customer for inefficient human performance."

Certain qualities of mind are commonly found among the best men. It seems to me three of these qualities are paramount.

The first is a recognition and acceptance of change. Change has become an outstanding characteristic of our economic and social environment. Change is a fact of life that must be expected and evaluated by any intelligent controller of the destiny of business.

Institutions never stand still. They adjust to new conditions and new requirements, or fail. Their success in adjustment to change determines their future.

And this leads to the second quality — a focus of attention on the future, not the past. It is a commonplace of regulation that it looks to the future. Yet this is easy to forget.

The change and improvement I have mentioned should come in orderly, planned steps. Such planning requires clear concepts of purpose, strength of leadership, and a continual focus of mind on the future.

Finally, the quality most vital to the success of regulation is a high sense of ethics. It is often pointed out that ethics cannot be legislated. The late Joseph B. Eastman, for many years a member of the Interstate Commerce Commission, said, "Good men can produce better results with a poor law than poor men can produce with a good law."

Certainly the quality of our future can lie only in the quality of our men. Let us do everything in our power to make this the very highest.—*To Be Continued.*

Part Two: — Progress With The All-Buried Telephone Service Concept

By JOHN S. REED

Important changes in the materials, tools, and technology involved in placing rural and urban telephone lines underground have reduced installation and maintenance costs and increased service reliability. This report on all-buried telephone service is Part Two of a two-part article. Reprints of this report will be available **(see page 42)****.**

Buried Wire Distribution Layouts

LAYOUTS for buried cable and wire are apt to be more critical than for equivalent aerial facilities. As pointed out in a previous part of the article, buried plant must be carefully designed to take care of all telephone service requirements extending well into the future to avoid expensive and time consuming extensions and additions to the underground plant. At the same time, the design must not be so liberal as to provide more lines for service than would be actually needed for the design period under consideration.

In the case of rural open-wire plant, it is a simple matter to string more wire as lines are needed to meet service requirements. Aerial cable can be reinforced by running additional cable, making transfers or "throws" and rearranging cable pairs as required to provide additional pairs for station growth in various areas.

Placing costs for a small buried cable are said to be about the same as in installing 6,000 pound messenger strand.[4] At first thought, it might seem that buried cable could be reinforced by plowing in another cable to provide needed relief. However, plant men who are familiar with buried plant have found that this is not an easy procedure. It is difficult to find a satisfactory location for the cable in the initial plowing-in work, and to place a second cable near the first one, would be more difficult, particularly if plowing area is limited.

In the initial design, a sufficient number of above the ground appearances of the buried facilities are needed to enable extensions of service lines or rearrangements of cable pairs to reach new customers with the minimum of additional trenching. It is not economical or practical to lay the wires directly to residences without telephone service contracted for, in the hope that the non-users will later request connections. The best plan is to have the above the ground appearances within a reasonable distance from the prospects' houses.

A sufficient number of spare pairs should also be provided in the installation of the buried plant to take care of unexpected service requirements. This is accomplished by designing the buried plant with a line fill lower than customary for aerial plant. R.E.A. specifies a line fill factor of five for buried wire and cables with more than 25 pairs, and four for cables of 25 pairs or less, as design guides in buried plant projects.[3]

The fill factor indicates the number of subscribers per line expected to be served within a specified design period, in this case ten years. The fill factor of five contrasts with the standard fill factor of eight for open-wire lines where the limit is eight subscribers on a multi-party line.

It should be noted that these fill factors are intended

[4] *Buried Wire and Plant, address by E. B. Wheeler, Southwestern Bell Telephone Co., at* 1960 *Texas Telephone Convention.*

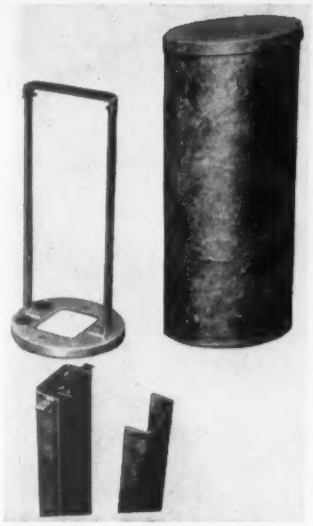


FIG. 27: — Exploded view of pedestal type terminal housing showing internal construction. Note channel pieces which fit together to form pedestal. (Indiana Steel & Wire Co.)

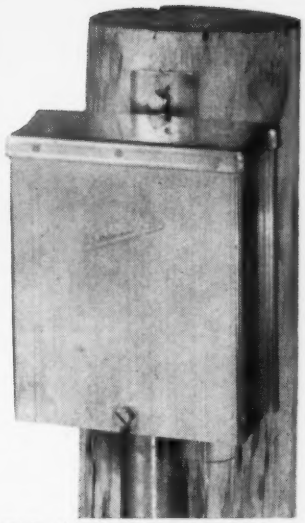


FIG. 28: — Terminal housing designed for pole mounting. The type shown is intended to accommodate buried wires and small cables along with terminal block and/or loading coils. (Reliable Electric Co.)

FIG. 29: — Terminal housing base (cover not shown) designed for pole mounting with terminal block and loading coil. (Communication Equipment & Engineering Co.)

FIG. 30: — Use of grommet plate at top of ground line cover of terminal housing pedestal. (Superior Cable Corp.)

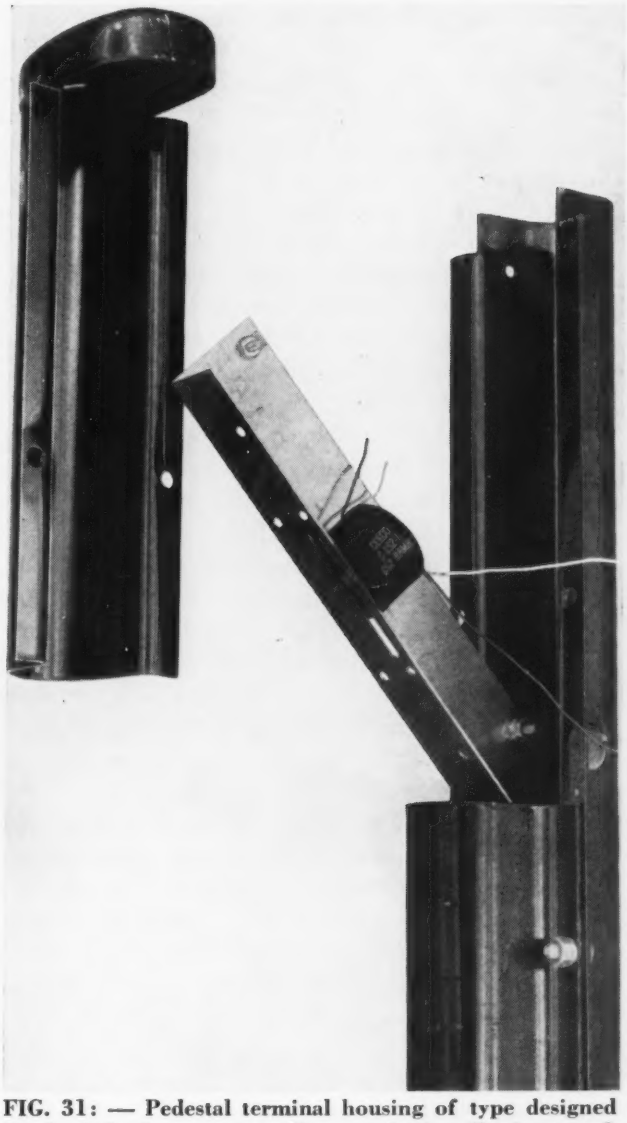


FIG. 31: — Pedestal terminal housing of type designed for buried wire systems. (Communication Equipment & Engineering Co.)

only to determine the number of cable pairs and buried wires and the cable diminishing points (locations of pair number reductions). They do not apply to the determination of the number of pair terminations, since enough pair terminations should be established to assure high line fills for maximum utilization of wires and cable pairs. In the assignment of pairs following installation of the plant, the party line fills are actually the same as for conventional aerial plant.

It is important to point out that the initial survey to locate present and prospective subscribers should include a study of telephone service market potentials, such as the possibility of a resort area, industrial plant, or suburban development being established later on. A careful and accurate survey that takes every possible growth factor into consideration will help to reduce expensive reinforcement of existing wires and cable to a reasonable minimum.

Terminals for Buried Cable and Wire

AS IN aerial cable distribution, buried cable must be properly accessed at various points on its route for connecting service lines to subscribers, providing junction points for cable or wire laterals, and aerial sections, and splicing reel ends of cable. To provide test points and auxiliary connections such as for loading and protection purposes, the cable should also have above ground appearances every 2000 feet. It is also desirable to have similar appearances near prospective subscribers if the distance is not too great and the terminal is on the main buried wire or cable route.

Such above the ground appearances are provided by installing terminal housings mounted on pedestals or poles and equipped with connecting blocks on which the wires and cable pairs can be terminated. The pedestal installations are designed to stand alone and have a channel construction obtained by two U-shaped pieces or channels fitted together to provide a runway for the wires or cables from below the ground level up to the housing as indicated in *Figure* 27.

In general, terminal housings mounted on poles are employed when an aerial drop is placed to the subscriber, also for connecting buried cable to aerial cable or open-wire circuits. The housing may be a round or box-shaped casing attached to the pole with "U" type metal guards to protect the wire or cable entering the housing as shown in *Figures* 28 *and* 29. Pedestal type terminal housings are also available modified for the purpose and equipped with mounting brackets to attach the housing to the pole.

Terminal housings are equipped with terminal blocks of the protected or non-protected type which are mounted on a slotted bracket in the housing. This bracket can be pivoted out for installing the terminal blocks and making connections to terminal posts. Provision is also made for mounting loading coils where these are required for extending the service range of the buried wire or cable.

To exclude insects and prevent moisture entry to as great a degree as possible, the housings are provided with a gasket or grommet plate to seal off the passage

FIG. 32: — Pedestal terminal housing for BD 2 or BD 3 service. (Communication Equipment & Engineering Co.)

way for the wires and cables. Insect webs and moisture accumulating on terminal blocks will create enough leakage to make the lines noisy.

Figure 30 illustrates the use of a grommet plate for sealing housings.

To reduce line leakage to a minimum, unused pairs of buried cable pass through the terminal housing without being connected on the terminal blocks. The insulation is left intact on these pairs.

Buried Distribution Terminal Housings

THE SIZES and construction of terminal housing depend on the number of pairs that are to terminate and/or loop through. Four general sizes of terminal housings are specified by REA for typical uses as follows:[5]

BD 1 — Two one-pair terminal blocks. Buried wire, one or two pairs, loaded or non-loaded.

BD 2 — Two 6-pair terminal blocks. Buried cable, 6 to 50 pairs (no splicing); 6 to 18 pairs (to be spliced); 25 pairs or less with 1 to 6 pairs ultimate loaded (no splicing); 18 pairs or less with 1 to 6 pairs ultimate loaded (to be spliced).

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[5] *REA Telephone Engineering and Construction Manual, Section* 641, *Construction of Buried Plant.*

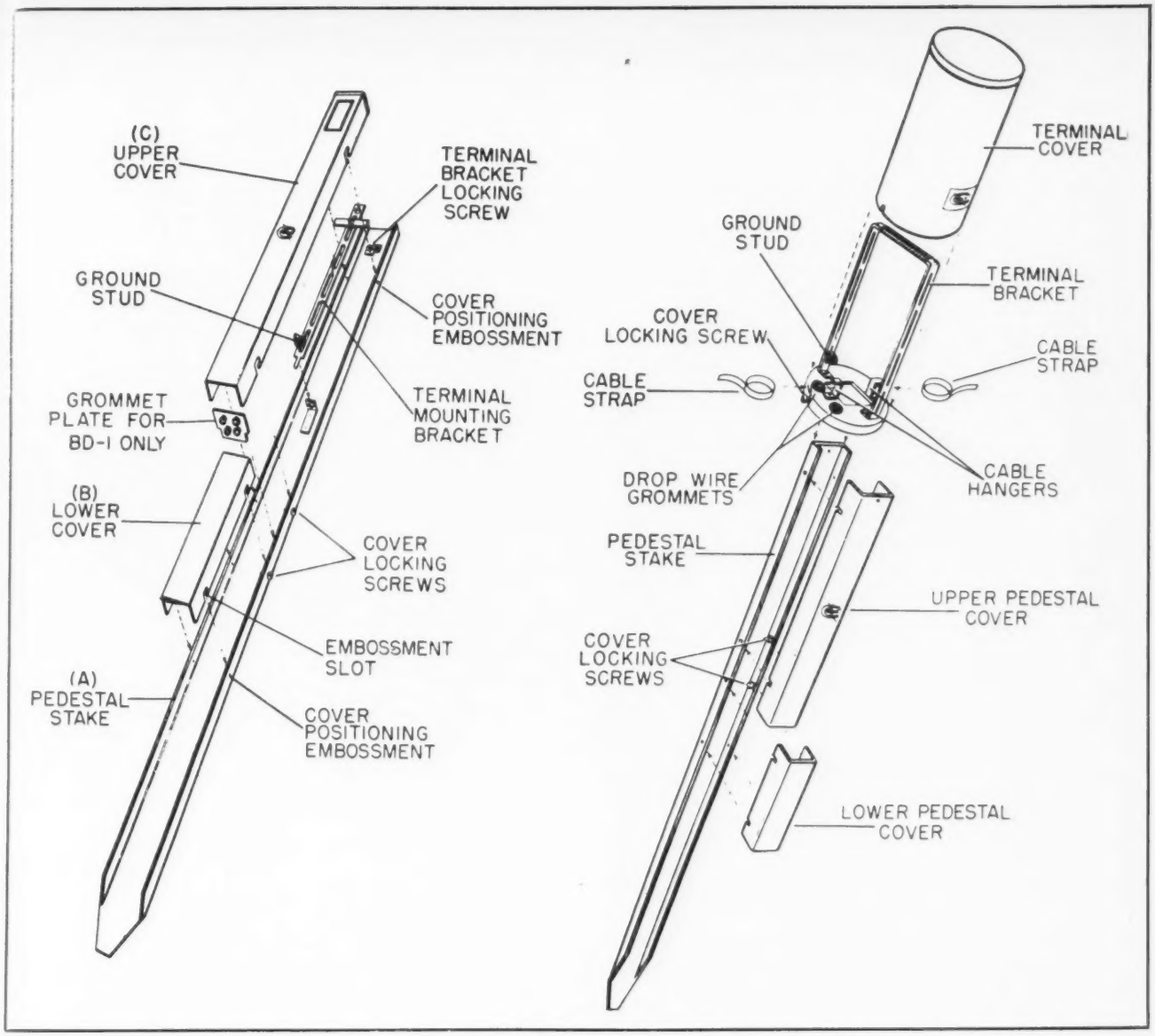

FIG. 33: — Cook Electric Company's BD Types 1 and 2 (on left) and BD Types 3 and 4 (on right) pedestal mounted outside buried plant terminals. These are exploded views showing internal construction of the two housing types.

BD 3 — Six 6-pair terminal blocks. Buried cable 75 to 150 pairs (no splicing); 25 to 100 pairs (to be spliced); 100 pairs or less with 1 to 18 pairs ultimate loaded.

BD 4 — Ten 6-pair terminal blocks. Buried cable, 150 to 400 pairs; 19 to 46 pairs ultimate to be loaded.

Figures 31 *to* 35 illustrate the various types of terminal housings made to accommodate the foregoing list.

Terminal housings for pole mounting are illustrated in *Figures* 36 *to* 38. These are similar to the pedestal mounted types, differing only in length of the ground portion of the stake and in the provision of brackets for attaching to the pole.

The terminal housings are constructed of heavy gauge steel, galvanized for long service life. The pedestal mounted types are about 6 feet long (in the stake portion) to enable burying the stake to about 3 to 3½ feet depth leaving 2½ to 3 feet above the ground. The larger housings have a greater over-all height because of the terminal base and cover which is attached to the top of the stake portion. Typical underground dimensions are indicated in *Figure* 39.

In the case of pole mounted terminal housings, the stake is 42 inches long, since only about 6 inches of the stake need be buried in the ground. The stake, in effect, becomes the riser for the wires and cable entering the housing.

Another type of buried cable terminal which is used to a considerable extent in urban areas is illustrated in *Figure* 40. The internal construction and wiring arrangement are indicated in *Figures* 41 *and* 42, which show the 12-pair and 36-pair types. The post and cover assembly is locked together by the base plate and the base plate has integral fixtures for clamping the cable sheath, thus providing a continuous ground shield. The assembly is said to be capable of withstanding vandalism such as

Next page, please

that involving the firing of 22 rifle bullets and low velocity pistol fire.

The 12-pair type provides for terminating up to 12 pairs unprotected or 6 pairs protected pairs and will accommodate up to 5 loading coils, also one 25-pair 19-gauge, 50-pair 22-gauge, 75-pair 24-gauge, or 100-pair 26-gauge cable. Eleven pairs can be spliced directly on the terminal block posts.

The 36-pair terminal enables terminating 36 pairs on non-protected terminal blocks and 18 pairs on protected terminal blocks. Up to 11 loading coils can be accommodated. If cable pairs are spliced by twisting the conductors and insulating with sleeves, it is possible for this terminal to accommodate 100 19-gauge, 200 22-gauge, 300 24-gauge, or 400 26-gauge cable pairs.

Figures 43 *and* 44 illustrate another group of related buried cable terminals designated as parkway pedestal terminals. The table below lists the capacities of the sizes of terminals available in this group. The bell jar hood is made of heavy gauge steel and has a diameter of 6 inches with heights as required by the terminal capacity.

Wire and Cable Capacity	Terminal Capacity	Loading Capacity	Approx. Hood Height
1.7" x 3.9" I.D.	1 to 12 pairs any gauge	6 pairs	8"
1.7" x 3.9" I.D.	1 to 24 pairs any gauge	12 pairs	14"
1.7" x 3.9" I.D.	1 to 32 pairs any gauge	16 pairs	14"
1.7" x 3.9" I.D.	1 to 56 pairs any gauge	28 pairs	21"
1.7" x 3.9" I.D.	1 to 104 pairs	52 pairs	32"

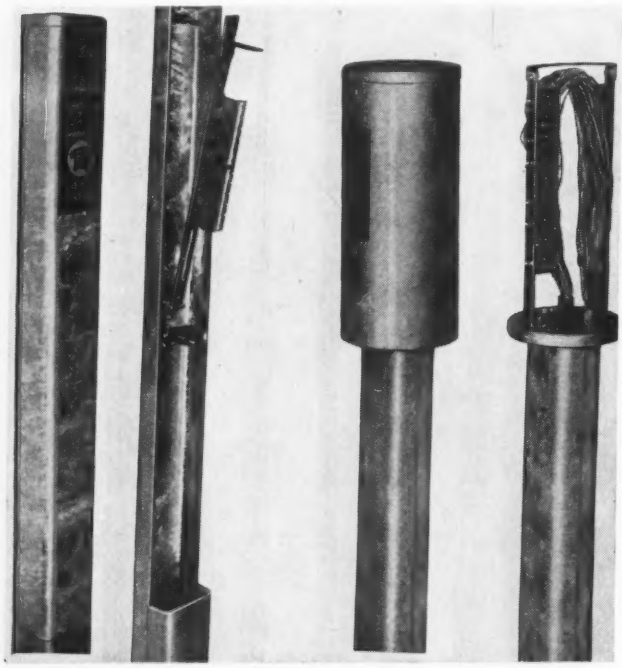

FIG. 34: — Indiana Steel & Wire Company's GSBD 1 or GSBD 2 pedestal type terminal on left and GSBD 3 pedestal terminal on right. The GSBD 4 type is of similar construction but larger in size.

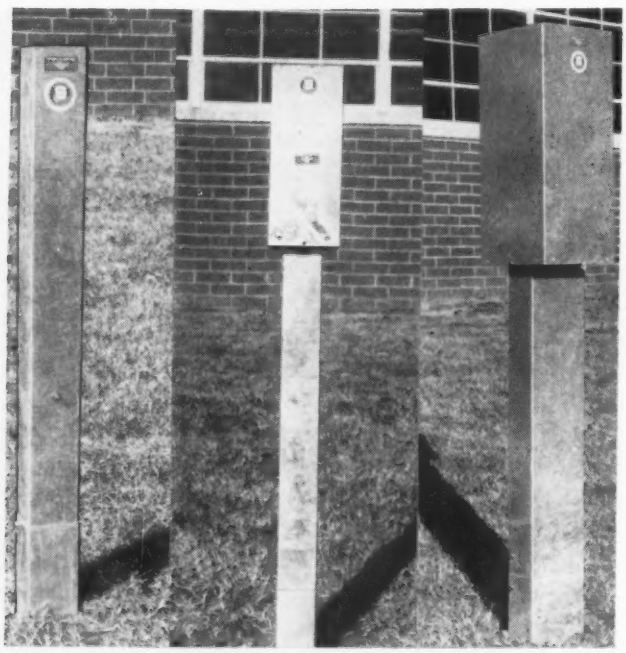

FIG. 35: — Superior Cable Corporation's 700 type (BD 1 and BD 2) pedestal terminal on left, 800 type (BD 3) in center, and 900 type (BD 4) at right.

Installing and Wiring Buried Wire and Cable Terminal Housings

THE method of installing terminal housings will vary somewhat with the make, size, and type of housing. A typical procedure that applies to type BD terminal housing is as follows:

At the end of the lateral trench dug from the main

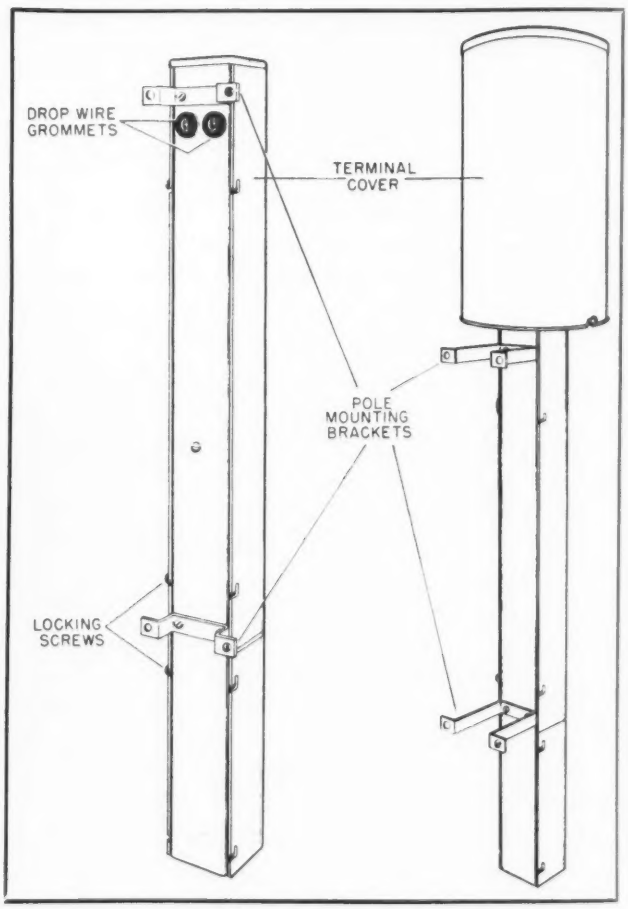

FIG. 36: — Cook Electric Company's pole mounted outside buried plant terminals. On right is the BD 1 and 2, Type A, and on left, BD 3 and 4, Type A.

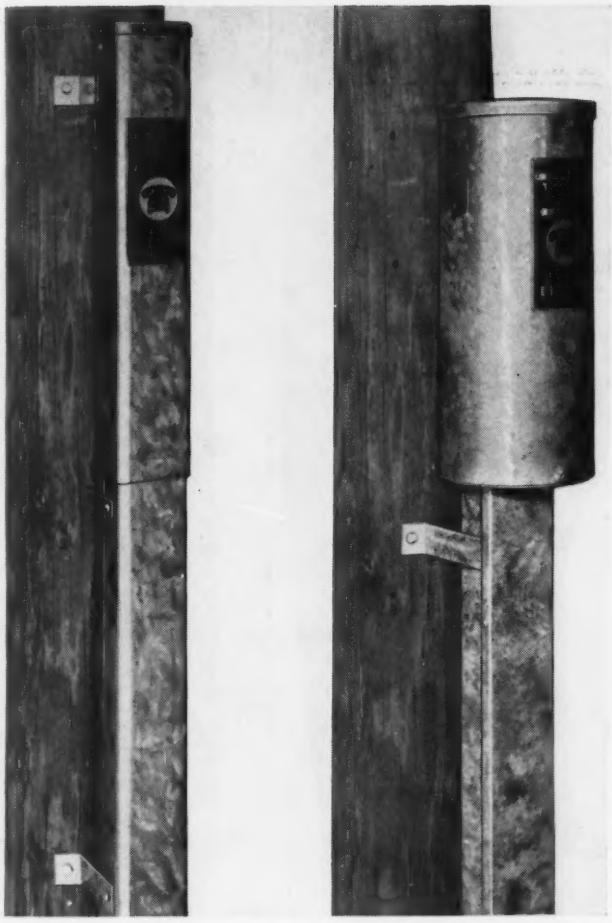

FIG. 37: — Indiana Steel and Wire Company's GSBD1A or GSBD2A pole mounted terminal housing on left. The GSBD3A or GSBD4A (round cover type) is shown on right.

line, install the pedestal stake as shown in *Figure* 45. Although it is satisfactory to drive the stake into the ground with a sledge hammer, some companies prefer to insert the stake at the end of the trench, so the minimum amount of driving may be done. This will reduce the possibility of distorting the stake end.

When the desired depth is reached, the cable and wires are laid along the trench, brought up the stake channel (*Figure* 46) and fastened in place by a clamp above the bottom or ground line cover. The bottom cover is then slipped in place, leaving 4 to 6 inches of the cover above the ground line.

To keep out insects and minimize moisture entry, a grommet plate is installed at the top of the bottom cover with slits cut in the grommets to pass the wire. (This plate is not practical when cables and wires almost fill the channel.)

Terminal blocks are fastened to the slotted bracket and this bracket is then bolted in place in the housing.

The buried wires are then trimmed to the proper length for terminating on the block posts. The outer jacket is stripped down to the ground post and the flat armor tapes are carefully unwound from around the insulated conductors. For a good ground connection, the tapes must be cleaned with trichlorothene or a reasonably safe solvent that will remove the flooding compound. After cleaning, the tapes are gathered together

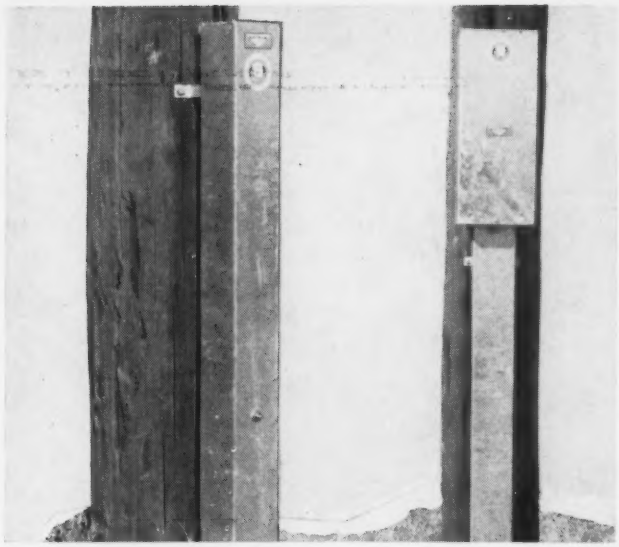

FIG. 38: — Superior Cable Corporation's pole mounted types of terminal housings. On right is the 750 type housing and on left is the 850 type.

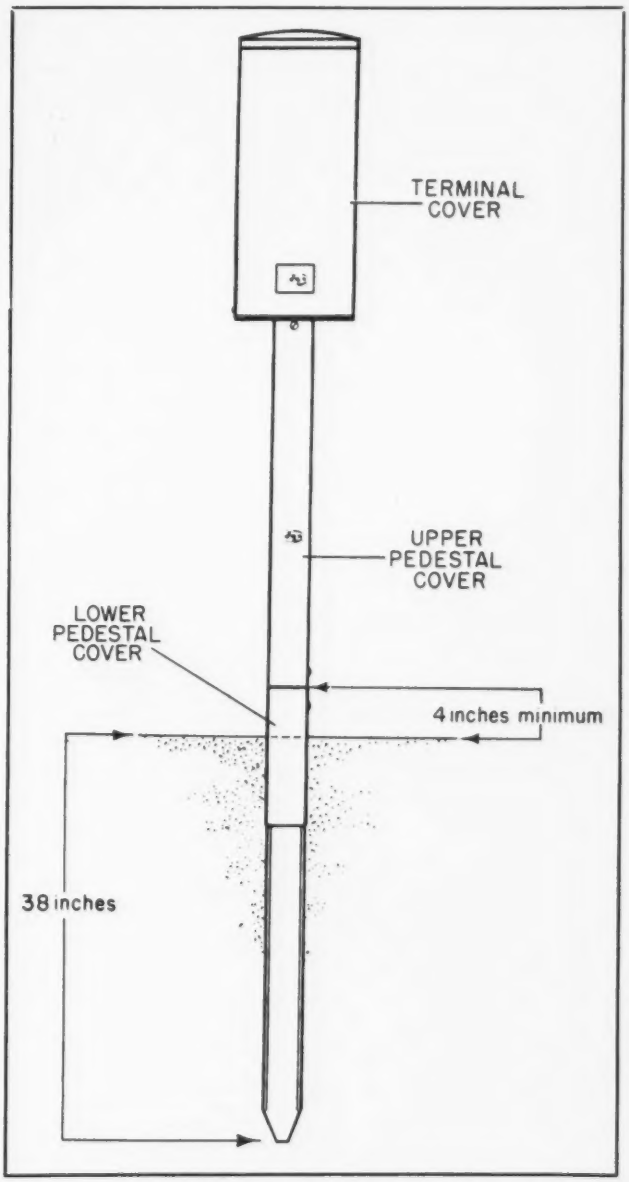

FIG. 39: — Showing typical underground dimensions for a buried plant type terminal housing. (Cook Electric Co.)

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Conductor Size	Number of Pairs	Guaranteed Number of Pairs	Approximate Overall Diameter	Approximate Net Weight	Shipping Weight	Standard Reel Length
			inches	lb per M ft	lb per M ft	feet
19	556	556	2.97	5950	8430	700
22	1111	1111	2.96	5940	8400	700
24	1818	1815	2.96	6060	8530	700
26	2424	2418	2.89	5270	7750	700
26	2727	2721	3.04	5990	8470	700

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Conductor Size	Number of Pairs	Guaranteed Number of Pairs	Approximate Overall Diameter	Approximate Net Weight	Shipping Weight	Standard Reel Length
			inches	lb per M ft	lb per M ft	feet
19	556	556	2.86	10,370	12,850	700
22	1111	1111	2.87	10,410	12,900	700
24	1818	1815	2.85	10,320	12,800	700
26	2424	2418	2.78	9,520	12,000	700
26	2727	2721	2.94	10,550	12,920	700

and clamped in the ground post. To prevent corrosion, the exposed steel tapes and ground post are painted with a corrosion resistant paint.

The conductors are then connected to the terminal posts on the blocks in the standard manner. Where a

Text continued on page 40

FIG. 40: — Utility Products Company 12-pair terminal on pedestal in location of housing development.

FIG. 41: — Interior view of 12-pair pedestal terminal showing cable loop and 6-pair terminal block. (Utility Products Company.)

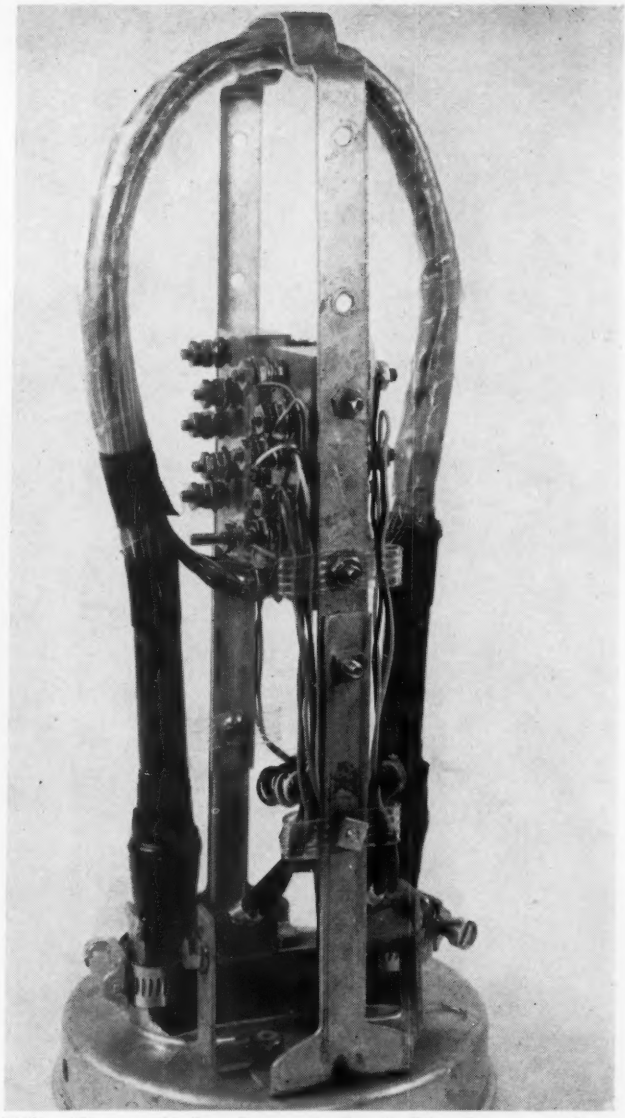

FIG. 42: — Pedestal terminal of 36-pair type. Note clamps to hold cable in position, also vise type clamps to grip buried wires in place and at same time obtain a good ground bond for the wire shields. (Utility Products Company.)

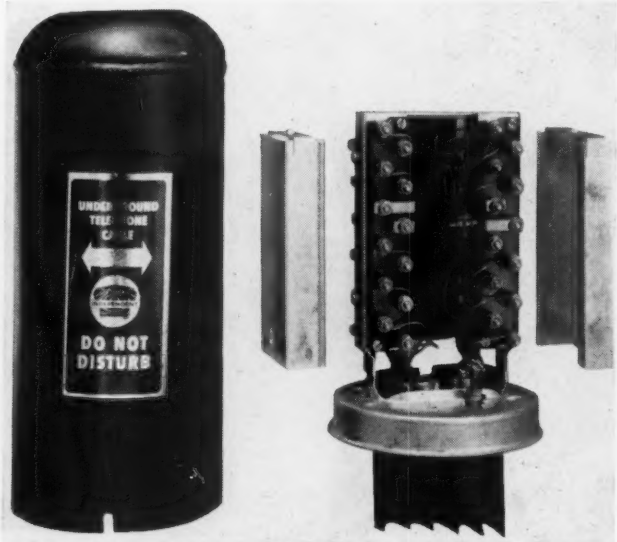

FIG. 43: — Pedestal terminal with two 12-pair terminal blocks and one loading coil. Note side plates for air-gap protection at each terminal stud end. (Communication Equipment & Engineering Company.)

FIG. 44: — Pedestal terminal with one six-pair terminal block. (Communication Equipment & Engineering Company.)

FIG. 45: — Installing terminal housing stake by driving into end of trench with sledge hammer on wood block.

FIG. 46: — Laying buried wires up channel of stake for terminal housing.

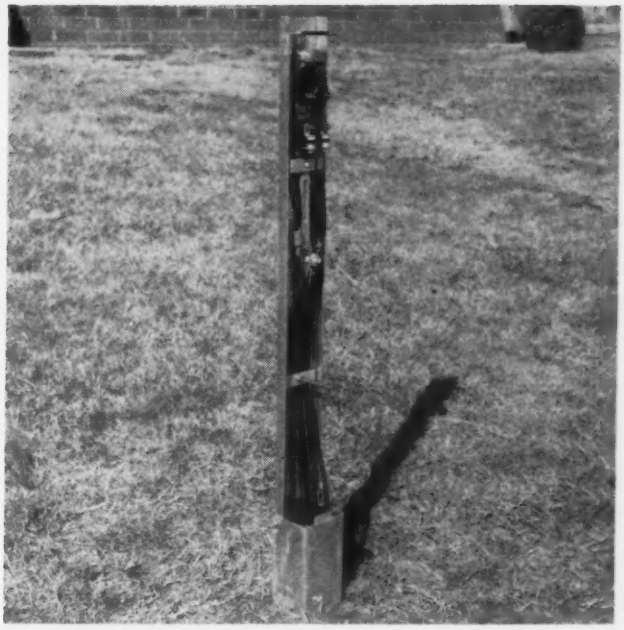

FIG. 47: — Typical installation and wiring of terminal housing prior to placing cover. Note shield wires bonded to ground post. (Superior Cable Corporation.)

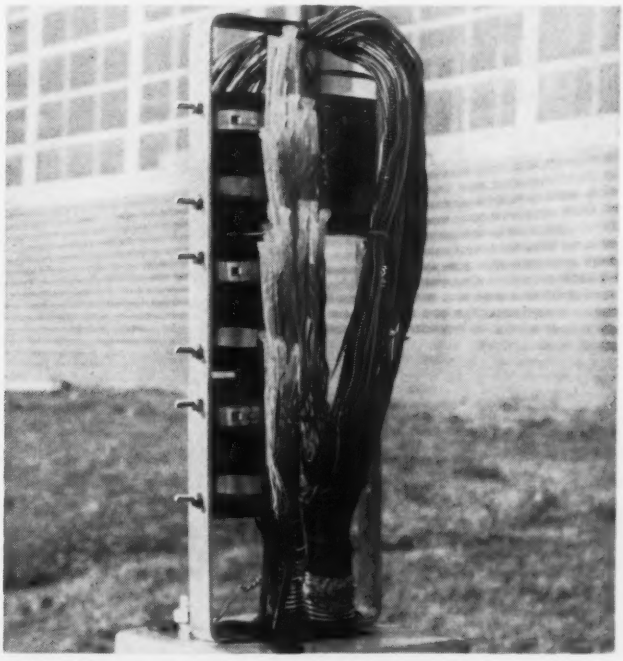

FIG. 48: — Typical wiring of terminal housing with spliced cable pairs. (Superior Cable Corporation.)

FIG. 49: — Detroit Edison Company's transformer housing and telephone company's terminal pedestal in Glenview subdivision of Plymouth, Michigan. (Michigan Bell Telephone Co.)

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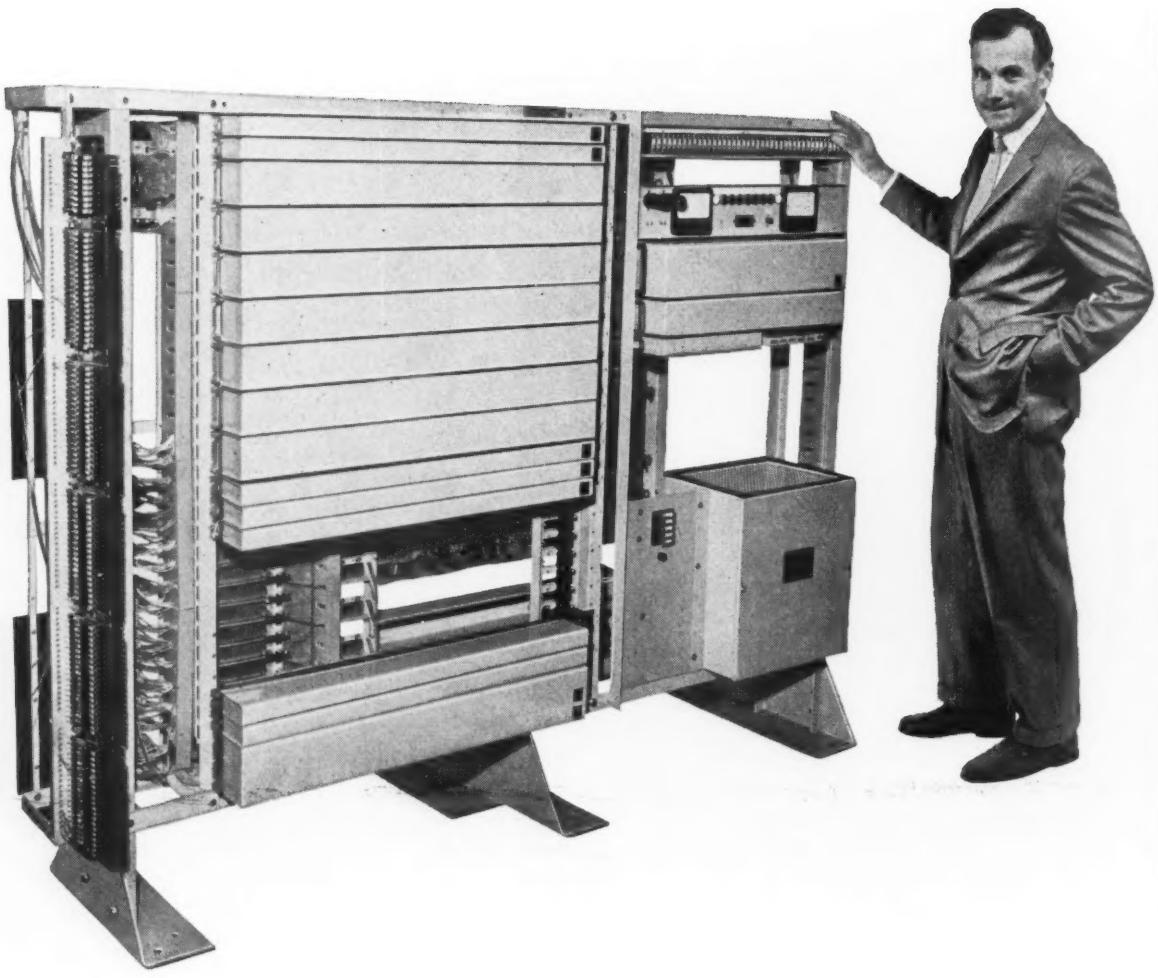

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"Buried Service Concept"

(Continued from page 37)

protected type terminal is employed, a ground rod is placed and connected to the ground post. The completed installation prior to placing the cover is illustrated in *Figure* 47.

In connecting together steel armor tapes and copper ground wire or copper shield, a split bolt connector is needed to separate the steel tapes and copper wire or shield. This will prevent galvanic corrosion resulting from the contact of two dissimilar metals.

Where cables are to enter the terminal, the cables will have to have a small portion of the jacket and shield removed from the looped end before the cable can be bent for entering the terminal housing. No more of the jacket and shield should be removed than needed to provide terminating lengths of the cable pairs.

The cable loop is clamped over the outer jacket with the clamping bands provided and the rest of the jacket removed. The shield is then pulled away from the core, leaving sufficient length for bonding to the ground post.

FIG. 50: — Trench for Edison Company's electric power conduit. The telephone company's cable was later placed in the same trench, above the power conduit.

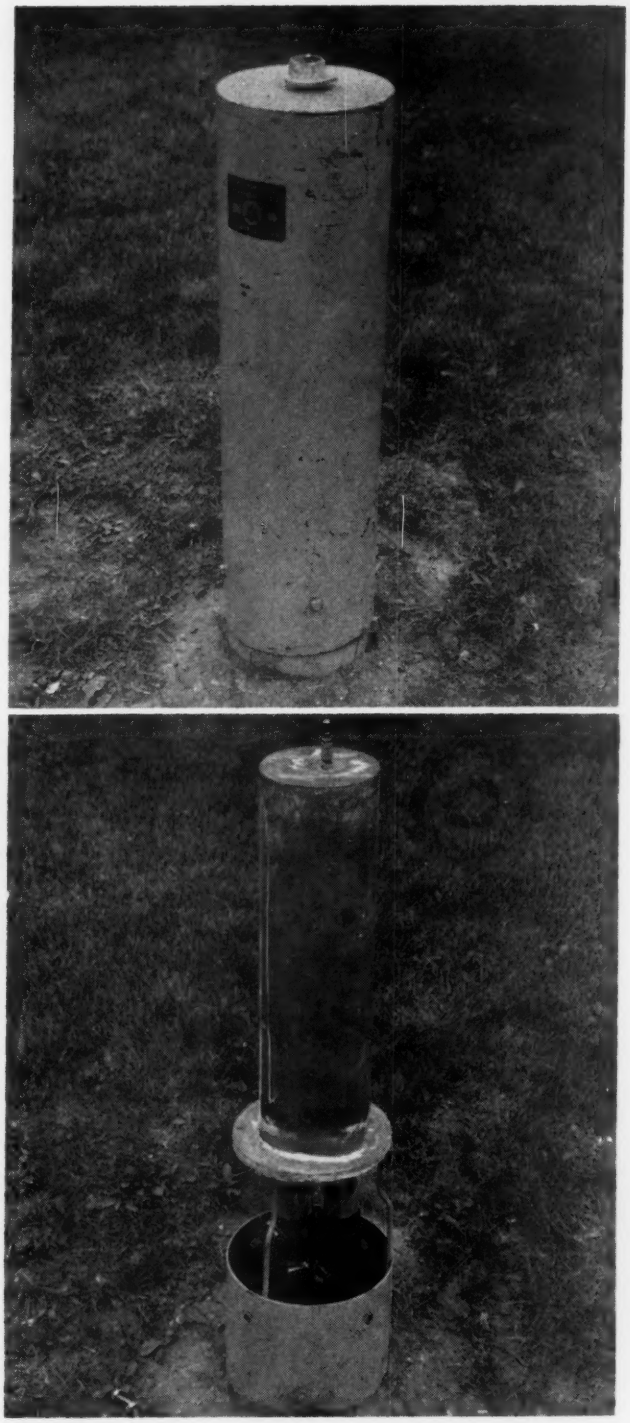

FIG. 51: — Large terminal housing used for "above ground" splicing of buried telephone cable in urban buried plant project. (a) At top is closed view with outer hood in place. (b) At bottom is interior view showing splice enclosure. (Utility Products Company.)

The required pairs are then terminated on the terminal posts. A piece of tinned copper ground wire is twisted tightly around the exposed shield. A narrow tab from the shield is formed around the twisted portion of the ground wire and soldered thereon. The wire is then connected to the ground post.

It is important to prevent the individual insulated conductors from contacting the housing side. The conductors may be taped or covered with a piece of plastic jacket previously removed. This will maintain the di-

FIG. 52: — Typical block in Springdale, Illinois subdivisionshowing power company transformer housing and telephone terminal pedestals in early stages of housing project.

FIG. 53: — Springdale, Illinois subdivision showing buried facilities of telephone and power joint project. Shrubbery and trees are being planted along rear property line of the lots.

FIG. 54: — The power and telephone joint-buried facilities are barely visible in the fully developed plantings along property lines in the subdivision.

electric strength of the cable core insulation, and prevent unnecessary breakdowns. Taping the loop of conductors to the insulated crossbar at the top of the terminal bracket will help hold them in position.

Splicing of cable conductors and insulating the splices is accomplished in the standard manner for plastic jacketed plastic insulated cable as shown in *Figure* 48.

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Identifying Wire and Cable Routes

AS IN the case of poles in a pole line, terminal housings should be numbered so their locations can be entered on the records of the company. The housing covers should have a warning sign to indicate the buried cables or wires must not be disturbed or damaged.

Without suitable markers on the wires and cables, it

Next page, please

will not be possible to determine which ones go in specific directions. The following table, based on REA data, indicates the marker colors (ASA standard for marking electrical apparatus).[5]

Marker Color	Direction Entering Terminal From:
Blue	*Central Office
Orange	North
Orange-Green	Northeast
Green	East
Brown-Green	Southeast
Brown	South
Brown-Slate	Southwest
Slate	West
Orange-Slate	Northwest
Red	**Services, Buried or Aerial

*Wires and cables from central office always require a blue marker regardless of compass direction.

**Buried or aerial service wires going into terminal are always marked red regardless of compass direction.

Self-sticking vinyl cloth markers with solid NEMA colors, 1½ inch size, are recommended for marking the wires and cable under the terminal cover.

Electrical Protection of Buried Wire Plant

BURIED plant may be said to be less exposed to chances of damage from abnormal voltages than aerial plant. Nevertheless, since buried plant has connections to aerial circuits, it is not possible for the buried wires and cables to be completely free from electrical damage. This is particularly true of buried plant in areas of severe lightning storms. Exposure to power contacts also cannot be avoided entirely.

For these reasons, electrical protection measures should always be applied to buried plant. Carbon block protectors of the same type standard for aerial plant should be used in all terminal connections to aerial drop wires, open wire, and rural distribution wire. Buffer type protection should also be employed up to within one-half mile of the junction of the aerial lines with the buried circuits.

The aerial protection ground connection should be bonded to the terminal housing ground post. Where the aerial plant is in joint construction the ground connection should also be bonded to the vertical grounding conductors of the multigrounded neutral sytsem wherever these are in proximity.

The shields of the cables and the armor shield of the buried wires should be bonded to the ground post of every terminal housing in which they appear. This continuous grounding arrangement is very important to effective electrical protection of the buried plant. At terminal housings where the pairs are protected, a

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ground rod should be driven and connected to the ground post.

Protection should not be omitted at subscribers' stations just because even the service wires are buried. Standard station protectors are employed with the shield of the service wire being connected to the protector ground post along with the connection to the station ground.

In the matter of lightning damage to buried plant, the important contributing factors, aside from the severity and frequency of lightning storms in the area, are earth resistivity, cable or wire sheath resistance, dielectric strength of conductor insulation with respect to sheath potentials, and the proximity of lightning attracting objects such as trees and fence posts.

Buried Plant in Urban Areas

THE discussion so far has centered on buried plant in rural areas. The burying of telephone cables and wires in urban areas has become quite extensive within recent years, particularly in the Bell System.

From the small beginning in 1956 when approximately 4,000 installations were made in five companies, the number of homes served has almost doubled each year.[4] In 1959, an estimated 34,600 installations were made in 15 companies. The conclusion has been reached that in companies where the desire and "know how" are present, and where there has been reasonable selectivity in the choice of locations, buried plant is claimed to be more economical than aerial plant.

Basically, buried subdivision construction is more costly than aerial. However, since labor is about 65 percent of the installed costs, there is room for reduction in that connection. By attaching an aesthetic dollar value to the buried plant it may be possible to get more for the money. Many developers are interested in the buried service concept and generally are willing to participate in at least a portion of the cost.

In one of the northern states where buried urban construction has progressed considerably, the excess "broad gauge" costs are handled in one of the following ways:

(1) No charge, where subdivision or developer digs and backfills trenches for the distribution cable and all service wires.

(2) $10.00 per lot where the subdivider or developer digs and backfills trenches for the distribution cable and the telephone company digs and backfills trenches for service wires.

(3) $15.00 per lot where the telephone company digs and backfills all trenches.

Telephone companies are not the only ones interested in burying their outside plant. Power companies have been doing something about burying electrical service lines and transformers.[6]

For instance, installation of telephone wires and electric power lines underground in a common trench was completed in several Detroit-area subdivisions during 1959.

Two years ago, the Detroit Edison Company joined with the Michigan Bell in a common-trench experiment in the Hidden Valley subdivision in Rochester. Six homes in the area were wired with jointly buried lines.

In 1959, nearly three miles of jointly-buried cable in housing developments in Plymouth (Glenview), Bloomfield Township and Grosse Pointe Farms were placed.

Common-trench installations are in the planning stages for 12 more Detroit-area subdivisions. In addition, this type of service has been completed in one trailer park with six more pending.

To bury an electric power line and phone cable, a narrow, 41-inch-deep trench is dug. The power line is placed on the bottom of the trench and covered with 12 inches of dirt. Over this layer of dirt, polyethylene-insulated telephone cable is laid, usually containing from 25 to 100 pairs of telephone wires. Then the trench is filled in completely.

The terminals along the telephone cable serving the area are mounted on pedestals about 42 inches high. Each terminal pedestal throughout a subdivision rests beside an Edison transformer. One of the terminals serves four houses with the final wire link lying hidden under the lawns.

Common trenching will mean much to the customers. It will enhance greatly the beauty of their surroundings. And, while service interruptions can still occur at the central office or at points where the cable leaves the ground outside the subdivision, it is very unlikely that any kind of storm could cause damage to the buried cable itself.

The new program has numerous advantages for the company. It takes a two-man crew, using little equipment, less time to lay buried cable. Installing aerial facilities in the same subdivision would take a five-man crew with heavy equipment much longer. Also, it eliminates the recurring cost of tree-trimming and saves the cost of poles and anchors.

Burying the cable does away with overhead wiring and drop wire clearance problems. Buried cable means less storm damage from wind and ice. Finally, man-made damage caused by fires, vehicles and firearms will be reduced to a large degree.

With the development of the plastic jacketed cable, Michigan Bell began to think seriously about common trenching. In all the joint-use jobs thus far, the contractors and designers have requested the underground burial method. There probably will be many more jointly buried jobs in the next few years.

During the next decade, it is predicted that the nation's builders will construct some 16 million new homes, or a total of one for every 11 Americans now living.

As labor and maintenance-saving common trenching installations are used on a wider scale to give telephone customers better service and a more attractive environ-

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[6] *Michigan Bell, Detroit Edison Go "Underground" — The Michigan Bell, March,* 1960.

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ment, the electric power and telephone pole, long a symbol of light and communications, could begin to disappear from the American scene.

Figures 49 to 54 show some details of recent urban buried plant projects.

Conclusion

THE all-buried telephone service idea has proved to be quite practical in many areas to replace badly rundown aerial plant and to provide service in new housing developments. Companies that have installed extensive buried telephone facilities in rural areas find that the buried plant provides relief from tree trimming and brush eradication expenses and costly storm damage. Nevertheless, the use of buried plant requires careful study to make sure that this type of facility can economically replace existing aerial plant. — *John S. Reed.*

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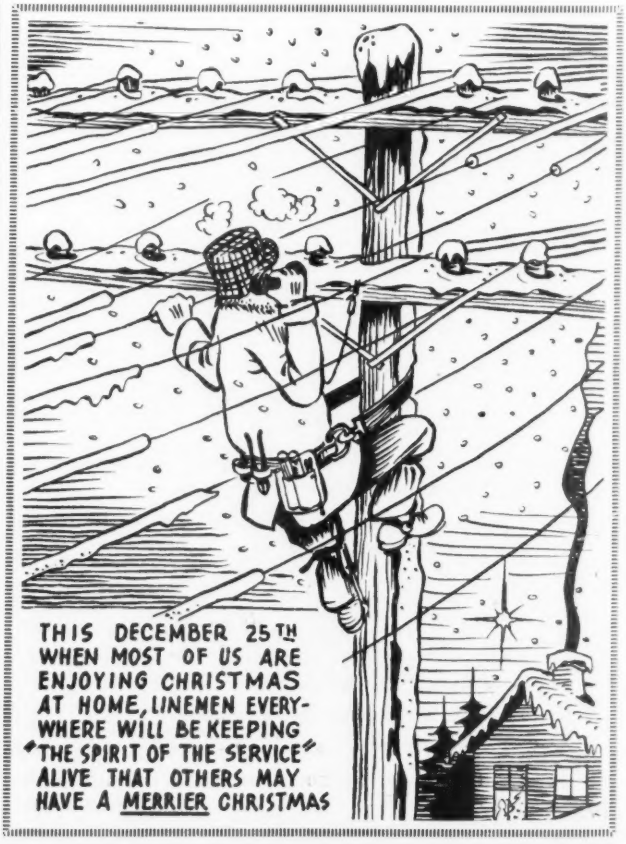
(5) REA Telephone Engineering and Construction Manual, Section 641, Construction of Buried Plant.

(6) Michigan Bell, Detroit Edison Go "Underground" — The Michigan Bell, March, 1960.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A Special
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Planning and Developing Rural Telephone Service

By DAVID A. HAMIL*

- **The impact of REA financing has contributed to some major changes in the patterns of telephone service outside the cities.**
- **By the end of 1959, 646 REA borrowers had placed in service 206,000 miles of line, and 2,259 new dial exchanges.**
- **The job ahead still involves modernization of more than 2,000 manual exchanges which serve small towns and farm areas.**
- **The demand for adequate service in rural areas cannot be satisfied by patching up tiny magneto systems.**

RURAL areas of our country have seen two periods of development in telephone service, with a gap of many years in between. The first period followed expiration of the basic Bell patents and extended roughly from just before the turn of the century to the years just prior to World War I. There was almost no planning, but plenty of development. Thousands of very small companies sprang up, sometimes several for a single town. Farmers worked together to string lines down the country roads. The promotion of this development came largely from equipment manufacturing companies looking for a market, following the release of patent rights.

During the 1920's, equipment began to wear out and to reach obsolescence. For lack of planning, smaller companies — and some larger ones, too — found themselves with no cash reserves for replacement and modernization, and with no place to turn for financing. This was due primarily to a lack of financial planning and to inadequate accounting records. Most of the small companies lacked a basis for or a source of adequate financing. Bell systems and the larger Independents bought up many of the small systems, but most of the consolidation and expansion was to provide service in the towns rather than on farms. Some rural companies just quit operating when the equipment deteriorated beyond the repair point. As a result, the percentage of farms with telephones decreased during the late 20's and 30's.

Development and Planning

THE SECOND period of interest in rural telephone service has had both development and planning. The need for adequate rural service had become so apparent during the years of World War II, that Congress passed, in October 1949, an amendment to the Rural Electrification Act of 1936, to authorize the Rural Electrification Administration to make loans for the improvement and expansion of telephone service in rural areas.

The impact of this financing has contributed to some major changes in the pattern of telephone service outside the cities. At the time when the REA rural telephone program got under way, 38.2 percent of this Nation's farms had telephones of some sort. Ten years later, close to 60 percent had telephones and an increasing proportion of the service was modern dial. This increase was brought about by the entire industry working together.

Another contrast appears in the number of systems and the kinds of systems providing the service. Nobody knows just how many different companies, mutuals, and farmer-owned lines existed in 1949 or 1950, but the count probably would have come close to 15,000. Few of them had ever bothered to incorporate. A majority were switcher lines, depending upon neighboring

*Mr. Hamil, is administrator of the Rural Electrification Administration, Washington, D. C.

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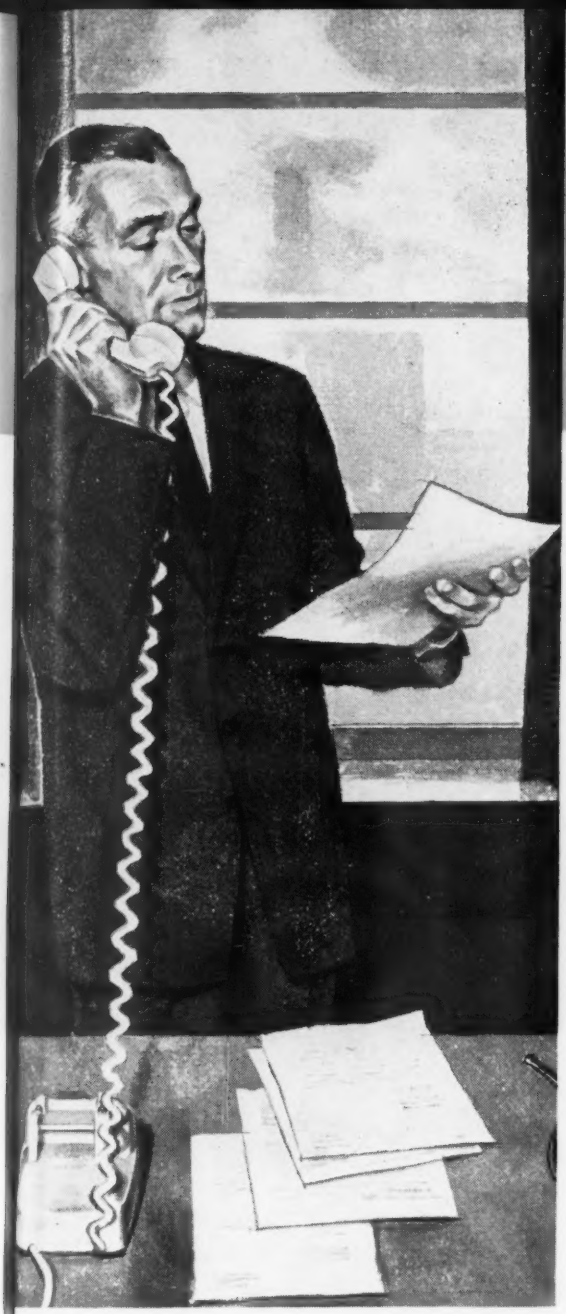

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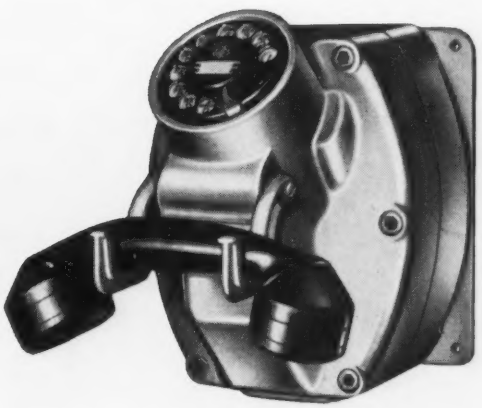

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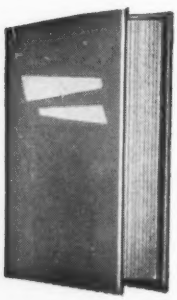

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systems for exchange service. Today, the number of Independent telephone companies and cooperatives is about 3,500. Switcher lines are disappearing fast, and the trend toward consolidation among the Independents continues.

Financing Through REA

ROUGHLY one-fifth of the Independents have turned to REA financing in order to improve and extend telephone service to rural areas. Up to July 1, 1960, REA loaned $679 million to 705 Independent telephone companies and cooperatives. These loans will finance modern dial service for 1,372,000 subscribers.

By the end of 1959, 646 of the REA borrowers had placed in service 206,000 miles of line and 2,259 new dial exchanges. At the same time, other Independents and the Bell companies have been expanding their service into rural areas at an increasingly faster pace. The job ahead still involves modernization of more than 2,000 manual exchanges which serve small towns and farm areas.

Out of a decade of experience with REA financing, some patterns are taking form — patterns that offer ways to adapt existing telephone service to still further rural development.

We have already noted that element number one in planning and developing rural telephone service is the merging and consolidation of very small properties. Sometimes this is a painful process. No one can say for sure where the border line is between small and *too* small, between a feasible system and one that has no base to justify long-term financing. We do know that the very small unit is not the vehicle for furnishing adequate service.

The advances in technology and the costs of building and operating a modern system, as well as subscriber demands for wider service areas, encourage the trend to larger systems. The size that will guarantee feasibility in a system is difficult to determine, due to dependence on such variable local circumstances as the geography of the area, its economic resources, potential subscribers the amount of overhead involved, and the assurance of sound business management.

What Rural Subscribers Want

A SECOND element recognized by the telephone industry is that ranchers and farmers and people in the very small rural communities will no longer be satisfied with 12-hour and 18-hour service, with overburdened party lines, with frequent equipment failures, with line noise and poor transmission, with waiting for completion of toll calls. Too many families in today's rural America have spent enough time in the cities to expect the convenience and pleasure of modern service: dial station equipment, graded service, and all the other advantages — ready for instant use around the clock.

A third element in planning and developing rural

telephone service is the trend toward Extended Area Service. Increased emphasis on EAS raises problems, and there are still many who view the concept with reserve. Yet its applicability rests on a basic need in rural telephone service that is widely recognized. That is the tying together of the rural area and the market town that serves its economic and social needs.

Some of the REA borrowers were among the first to recognize that farmers were no longer content to have a telephone just to talk to their neighbors down the road. The farm family today depends on adequate telephone service that permits easy communication with the nearby county seat or market town. That is where the stores and shops are located.

There, too, are the doctors and other professional people, the shippers and processors who buy the farm crops, the church and recreational centers, relatives and friends who are too far away for quick neighborly visits but who can be brought close through the telephone. Good roads and adequate telephone service have broken down the barriers that used to separate town from country living.

In working with applicants for REA loans, situations were found in which a town was served by one company and the farming region nearby had to depend on another company or perhaps several farmer-owned switcher lines with obsolete equipment and no possible basis for expansion. Adequate communications service under

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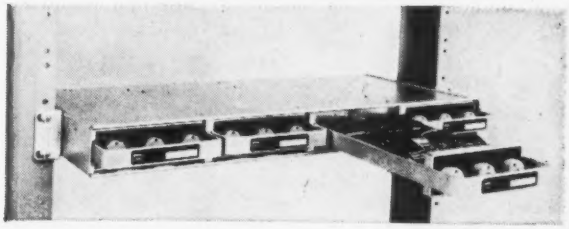

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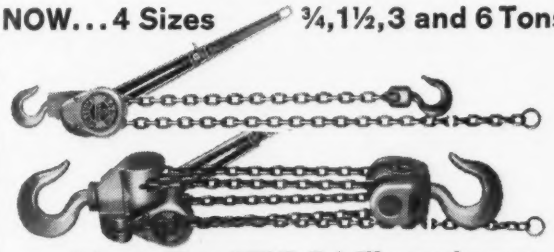

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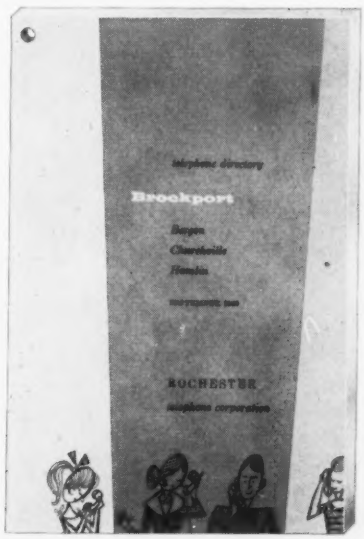

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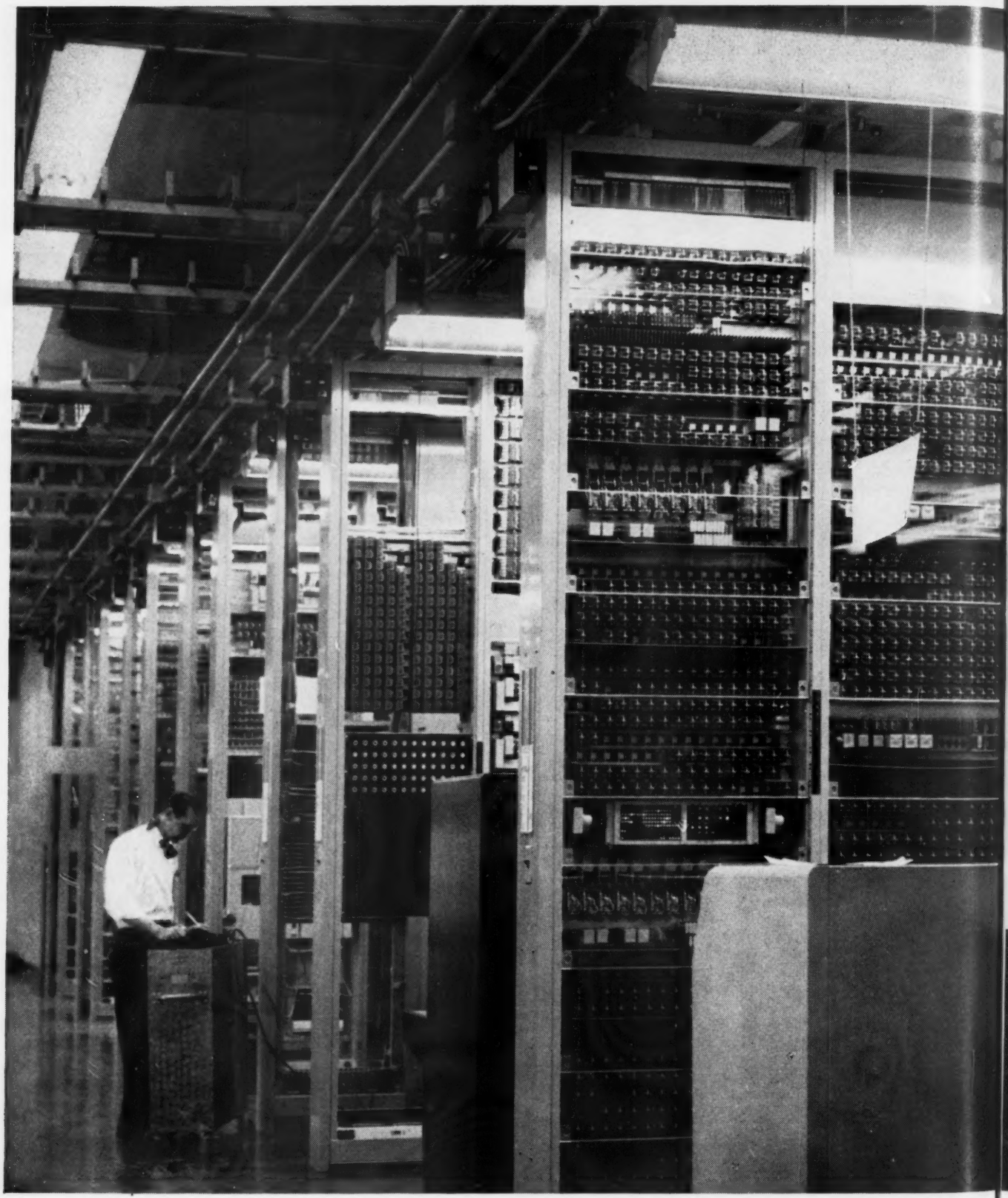

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Bell Telephone Laboratories, Western Electric, and the Bell telephone companies are Bell System teammates dedicated to communications progress in the United States. Bell Laboratories is responsible for research, design, and development; Western Electric, for the manufacture of equipment. Working together they help provide the Bell telephone companies with their equipment needs.

The modern telephone is only one of many communications advances made by Bell Telephone Laboratories. The revolutionary transistor sprang from Bell Laboratories research. Today's transoceanic telephone cables and satellites circling the globe are possible largely because of the Laboratories' efforts. Radio astronomy was a Labs discovery... Bell Laboratories' interests range from theoretical research into all areas of communications technology.

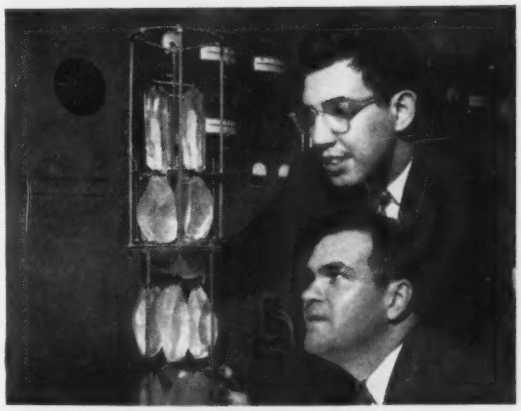
From Bell Labs pioneering have come such basic contributions as the first high-vacuum electronic tubes, indispensable in long distance telephony; advances in dial switching, culminating in today's direct distance dialing; coaxial cable and microwave transmission systems. In the final stages of Bell Laboratories development work, Western Electric engineering and manufacturing people, working side by side with Bell Laboratories personnel, provide production skills and facilities needed to turn discoveries and developments into equipment for the Bell telephone companies.

Because of this experience in the telephone business, Bell Laboratories and Western Electric have been called upon by the Government to play major roles in such communications projects as DEW Line, SAGE, White Alice, and BMEWS; and to create radar equipment and guidance systems for Nike, Titan, Terrier.

Now—Space. In 1959 Western Electric was named leader of an industrial team including Bell Laboratories to prepare a worldwide communications network for America's astronaut-in-orbit program. In 1960 the Project Echo balloon satellite was directed into precise orbit by a Bell Laboratories command guidance system, helping to launch a new era in communications in which Western Electric will also play a major role.

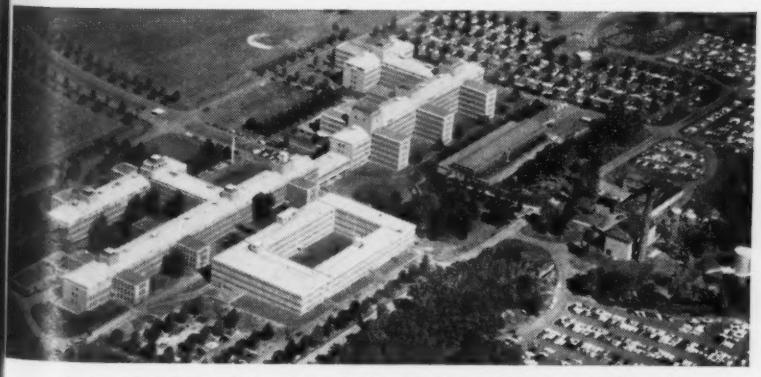
Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

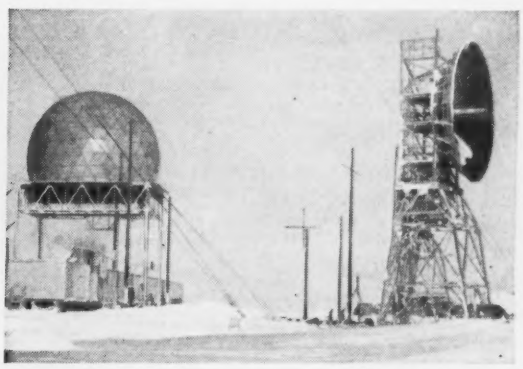


STUDYING QUARTZ CRYSTALS "grown" synthetically for Bell System communications equipment at Western's Merrimack Valley Works in North Andover, Mass., are R. A. Laudise (at top) of Bell Telephone Laboratories and R. A. Sullivan of W. E.

COOPERATION between Bell Laboratories and Western Electric results in swift transition from development to volume manufacture. Here, at Western's Indianapolis Works, the designs of the Laboratories are translated into new Princess telephone sets.



AT MURRAY HILL, N.J., Bell Telephone Laboratories has the largest industrial research complex in the U.S. (4,560 employees). The Labs also has research centers at Holmdel, N.J. (140 employees), New York City (2,690), and Whippany, N.J. (3,360).



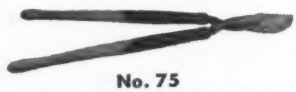
DEW LINE, a network of some 60 radar stations spanning the top of North America, is one of many Government projects to which Western Electric and Bell Laboratories have made major contributions.

POLE PRUNERS

No. 11
Cuts up to 1" branches. A strong, durable, easy cutting 18 foot tree pruning unit. Spruce extension poles in 6 foot sections, with telescoping aluminum joints.

No. 12
Cuts up to 1½" branches. Pruner head is malleable iron casting, husky, unbreakable. Smooth, easy cutting action.

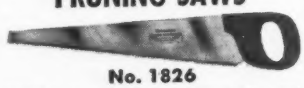
LOPPING SHEARS
Heavy duty, fast easy cutting loppers designed for utility use.



No. 75
Compound lever cutting action, smoothly slices through 1¾" to 2" branches.

Nos. 525, 530
The famous "Tiffany" pattern lopping shears 25" and 30" models. Cut branches up to 1¾".

PRUNING SAWS



No. 1826
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such circumstances was difficult.

Telephoning should be made easy for subscribers, and extended area service between companies serving the area can help in this respect.

REA believes that the fairest and most practicable arrangement is for each company to provide its own switching and terminal facilities and one-half of the interconnecting trunks. This is based on the two-way nature of every telephone call. In the long run about as many calls will originate in one system as in the other.

A system design and rate structure that ties the urban center to the surrounding countryside is an important element in planning and developing a merger or acquisition or in simply extending service from a town out into unserved rural areas.

This brings us to still another element in planning and developing rural telephone service. This is REA's concept of "area coverage." It was declared to be the policy of the Congress, in creating the rural telephone program, to "assure the availability of adequate telephone service to the widest practicable number of rural users of such service." The governing word in this directive is "*practicable*," which REA interprets to mean the maximum coverage that is economically feasible.

The application of area-wide services by REA borrowers to the greatest practicable number of subscribers demands more attention to system planning than has been customary in some segments of the Independent telephone industry. The pre-loan steps which go into this kind of planning include:

(1) Determination of a feasible service area, which may involve some consolidations and acquisitions.

(2) A commercial survey which shows existing subscribers, applicants for service, and potential subscribers, together with anticipated class of service.

(3) A 10-year forecast to determine the amount of backbone plant required in the system design, and a 5-year forecast which will be the basis for the REA loan application and the initial design of the system.

(4) A system design based on the area coverage survey and forecasts and engineered to take advantage of all reasonable economies in making adequate service available to the widest practicable number of subscribers. Such a system design must avoid overbuilding and yet permit optimum anticipated expansion. Engineering "know-how," the experience of other telephone companies, and REA's recommendations all contribute to success in this stage of planning and development.

What Will Farm Subscribers Pay?

FEASIBILITY of REA borrowers undertaking the service to rural areas rests on subscribers' willingness to pay adequate rates for adequate service. There was a time when 75 cents or $1. a month was the prevailing rate for use of a farm telephone. And there was some widespread apprehension that farmers would be reluctant to pay more for better service. What telephone companies have had to prove was that they were willing to give the farmers the same high-quality service provided in the cities, in exchange for rates sufficiently high to cover the costs of doing business.

The average telephone bill to farmers for local service has been increasing each year along with the improvement in system facilities. Data collected by the Crop Reporting Board of the U. S. Department of Agriculture show that in the 1947-49 period just prior to the start of the REA rural telephone program, the average monthly billing to farm families throughout the United States was $2.29. By 1958, the average billing had moved up to $4.08. Billings were highest in the New England states, and lowest in the North Central states.

These averages are held down, of course, by low billings for unimproved magneto service still found in many farming areas. That the rates for rural service have not moved up-

ward at a faster rate may be due also to economies which have become possible in constructing and operating the new rural systems.

Dial equipment is expensive, and all costs have been moving upward in the last decade, so that acquisitions, engineering, materials, and labor all contribute to higher investments and higher operating expenditures.

REA has been keenly aware that all possible steps must be taken to cut costs in providing service to thin rural areas. Dial equipment represents a big investment for a small company. Rising prices on acquisitions, engineering, materials, and labor all contribute to increased loan needs and to higher operating expenditures. The need to cut costs has been so evident in the promotion of rural telephony, that REA has taken a leading role in working with all segments of the telecommunications industry to develop techniques and facilities especially designed for the service needs and cost requirements of rural areas.

Results of research and development in this field have helped to improve and extend rural service. All telephone service organizations, whether REA borrowers or not, have been able to take advantage of the advances made as a result of REA-supported research and development.

Buried Plant Increases

ONE OF the most spectacular breakthroughs has been in buried plant. In cooperation with engineers, manufacturers, and contractors, REA promoted this concept of rural telephone plant through the use of newly developed plastic-coated cable and wire suitable for direct burial.

REA borrowers completed 5,156 miles of buried plant during 1959. This was 17.8 percent of all line construction. During the previous year, only 3.3 percent was buried plant.

Plastic-insulated, plastic-jacketed wire and cable are now in general use for buried plant construction. A complete new line of pedestals, terminals, load coil cases, and other accessories now permits plowing in of the wire and cable, with entire systems being placed underground away from most

Look at the many different

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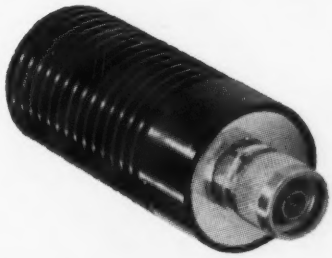
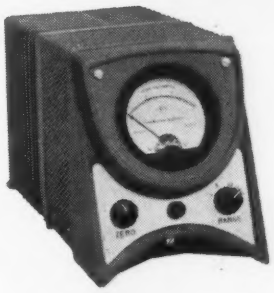


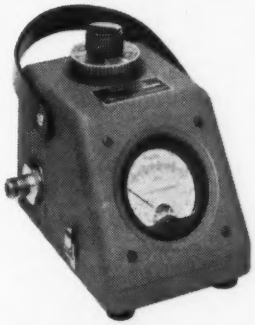
Model 160 50 ohm Coaxial Loads

Now including Models operating to 11 KMC, Sierra 160 Series low VSWR terminations may be used when stable 50 ohm loads are required. Featuring rugged design, high stability at full rated power, the loads have a typical VSWR of 1.2. All models are air-cooled and complete shielding insures personnel safety. Models with power capacities of 1, 5, and 20 watts are available with N, C and BNC connectors. 100 and 500 watt models Type N connectors. $20.00 to $170.00



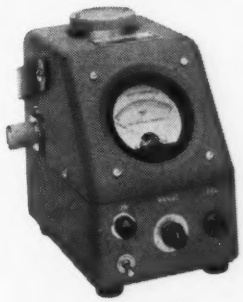
Model 185A Average-Reading Termination Wattmeters

Sierra 185A series are particularly useful in terminating rf coaxial transmission systems, measuring average powers between 20 and 1,000 MC, and as dummy loads for testing and adjusting CW and FM transmitters and oscillators. Three models with maximum power dissipation of 15, 100 and 500 watts, and power ranges of 0 to 5/15, 0 to 30/100 and 0 to 150/500 watts, respectively. Accuracy is ± 5% and VSWR is 1.2. Female Type N connectors. Model 185A-15FN, $170.00; 185A-100FN, $260.00; 185A-500FN, $315.00.



Model 164A Average Power Monitor

Sierra 164A Series Bi-Directional Power Monitors are now available with plug-ins down to 2 MC. Four plug-ins provide full scale ranges of 1, 5, 10 and 50 watts through frequencies 25 to 1000 MC. Two medium-power units provide full scale ranges 10, 50, 100 and 500 watts, 25 to 1000 MC. Two high-power units provide full scale ranges of 50, 100, 500, 1000 watts, 2 through 75 MC. Model 164 is now available with Type N, C, HN, UHF and LC connectors. Model 164, $115.00; plug-ins, $70.00 to $170.00.



Model 194A-A Bi-Directional Peak Power Monitor

Covering 200 to 1,215 MC, Sierra 194A-A Peak Power Monitor offers two important, time-saving features—peak power is read directly without computation and a reversible directional coupler permits incident or reflected power readings simply by turning one knob. Peak powers to 30 Kw are covered in 4 ranges. Measurement accuracy is ± 10% full scale at pulse widths down to 0.1 μsec or repetition rates as low as 10 pps. Minimum duty cycle 0.04% for specified accuracy. $460.00.

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6562

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Markets as of November 28, 1960	DIVIDEND	BID	ASKED	LAST SALE
American Tel. & Tel. Co.	$3.30			94⅞
Anglo-American Tel. Co. (Br. Col.-Dom. Rep.)	1.20	41½	42½	
Bell Telephone Co. of Canada	2.20	47¾	48	
British Columbia Tel. Co.	2.20	46⅜	48¼	
Calif. Interstate Tel. (Calif., Nev.)	.70	12¾	14	
Calif. Pac. Util. (Calif., Nev., Ore.)	.90	20½	22	
California Water & Tel. Co.	1.36	28½	30	
Carolina Tel. & Tel. Co.	1.60	41½	43¼	
Central Elec. & Gas Co.	1.20	27⅜	28¾	
Central Tel. Co. (Minn., Ia., N. C.)	.88	21	23	
Chenango & Unadilla Tel. (N. Y.)	1.20	26½	—	
Cincinnati & Suburban Tel. Co.	4.50	94	97	
Citizens Util. Co. (Calif., Pa.) "A"	stk only	18½	20	
Citizens Util. Co. (Calif., Pa.) "B"	.48	15¾	17	
Commonwealth Tel. Co. (Pa.)	1.00	21¼	23	
Floirda Tel. Corp.	1.00	25½	27	
General Tel. & Electronics Corp.	.76			26½
Hawaiian Tel. Co.	1.00	22	23½	
Independent Tel. Co.	none	8	9	
Indiana Tel. Corp.	.50	23	26	
Inter-County Tel. & Tel. Co. (Fla.)	.72+stk	24	26	
Inter-Mountain Tel. Co. (Va., Tenn.)	.80	16	17½	
Jamestown Tel. Corp. (N. Y.)	5.60	88	—	
LaCrosse Tel. Corp.	.80	15½	—	
Lincoln Tel. & Tel. Co. (Nebr.)	2.60	64	—	
Lorain Tel. Co. (Ohio)	1.40	33	—	
Middle States Tel. Co. (Ill.)	.80	26½	30	
Mountain States Tel. & Tel. (Ariz., Colo., Mont., Tex.)	.90			24⅝
New England Tel. & Tel. Co.	1.72			37⅞
North Carolina Tel. Co.	none	15/16	1⅛	
Northern Ohio Tel. Co.	2.00	52	54	
Pacific Tel. & Tel. Co.	1.14			28¼
Peoples Tel. Corp. (Pa.)	4.00	100	—	
Pioneer Tel. Co. (Minn.)	1.00+stk	34	37	
Rochester Tel. Corp. (N. Y.)	1.00			22
Southeastern Tel. Co. (Fla.)	1.00	21½	23	
Southern New England Tel. Co.	2.20	45¾	47	
Southern Nevada Tel. Co.	1.00	28½	30	
Southwestern States Tel. Co. (La., Ark., Okla., Tex.)	1.20	24¼	25¾	
Telephone Service Co. of Ohio "A"	.36	27	29	
Telephone Service Co. of Ohio "B"	.36	29	31	
Tidewater Tel. Co. (Va.)	1.40	25	—	
Virginia Tel. & Tel. Co.	1.00	20½	22	
United Utilities, Inc.	1.40	44	46½	
West Coast Tel. (Wash., Ore., Calif.)	1.28	25¾	27	
Western Union Telegraph Co.	1.40			40¼
Western Utilities	.36	7¾	8½	
Western Light & Tel. Co., Inc. (Mo., Kans., Ia.)	2.00	43½	44½	

(Source of Market — DEAN WITTER & CO.)

destructive elements and at costs comparable with aerial plant construction in many instances. Present data indicates that buried plant will substantially reduce service outages. With additional experience in field testing and development, it is hoped that per-mile construction costs for buried plant can be still further reduced in comparison to open wire plant.

A 24-month study of buried plant now under way on the systems of nine REA borrowers is expected to yield valuable data.

REA Tests Long Spans

ANOTHER way to hold down costs in open wire construction may come through long span design. Field tests among REA borrowers are under way to assemble feasibility data on long span construction, not only to check out initial savings, but to record maintenance costs and possible advantages in reducing outages.

The long span concept relies upon spacing poles far enough apart so that when loaded with ice the wire will rest on the ground before the tension exceeds the elastic limits of the wire.

Fifty-five percent of rated breaking strength was selected as the critical point in designing the rural system of an REA borrower in Minnesota, where field tests are being observed on 450 circuit miles of insulated wire. The actual amount of ice load that will put any wire on the ground varies, of course, according to the length of the particular span and the height of the conductor above the ground, as well as the strength of the conductor. The average span length is close to 900 feet on this particular rural construction. Normal ground clearance of 14 feet was provided under all spans. By placing the poles on the highest points of the terrain, it was possible to use 25-foot poles.

This type of construction in farm areas subject to sleet and ice storms, with fairly level terrain, few highway and railroad crossings, and few subscribers to the mile may offer important advantages.

REA also has explored the development of microwave trans-

mission for crossing lakes, swamps, and mountainous areas where pole line construction would be too costly in reaching small pockets of rural subscribers. Subscriber carrier, dial mobile radio-telephone service, full color coding, standardized materials and dial exchange equipment for rural C. O.'s are other technological developments in which REA participated in the effort to make adequate telephone service available to as many rural subscribers as practicable and at reasonable rates.

Some REA borrowers have found savings in joint use of poles, where rentals could be worked out on an equitable basis.

Holding Down Costs

SOME of the very early REA financing went to companies and cooperatives which had no towns to "sweeten" the cost of serving the farms, isolated rural crossroads, and scattered non-farm rural dwellings. With subscribers scattered, the average cost of construction per station ran high. Most loans, however, have been made to small town systems that extended their service into surrounding farm areas, or to telephone organizations which put together a feasible combination of town and country area through merger or acquisition.

The average per station construction cost for REA borrowers has held at a rather steady level during the 10 years of the lending program. That the figure has not climbed along with generally rising price levels is probably due to standardization and the many economies which have been an important part of REA financing.

To stay in business, management must keep operating costs in hand. This requires records and accounts that tell what the costs are and properly allocate them. In the early days of telephony, literally thousands of the very small rural companies ran without any real bookkeeping. There were many manager-owners who paid for station equipment and the family's groceries out of the same cigar box. State regulatory commissions, industry associations, and REA all have pressed for proper accounts as a basis

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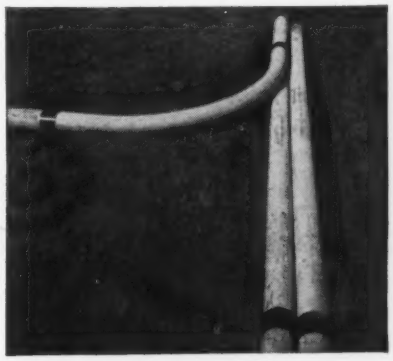
Available in 10-foot lengths, light-weight Transite saves installation time and requires smaller installation crews. Because these ducts can be laid in direct contact with each other, no between-tier backfilling is necessary. This means shallower, narrower trenches and lower excavation costs. Transite's easy-to-install plastic coupling is a real money-saver, too! With a flexibility of 5 degrees, it permits simplified splaying without special fittings. Installation savings of up to 15¢ per foot have been made!



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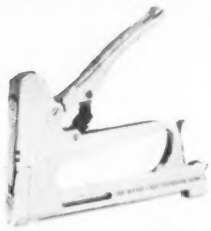

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for responsible management and sound financial controls.

The 700 REA borrowers are, first of all, incorporated under the laws of the states in which they operate. REA requires that each borrower subject to the jurisdiction of a state regulatory commission shall keep its accounts and records in conformity with the commission's rules and regulations. The Uniform System of Accounts prescribed by the Federal Communications Commission is followed by REA borrowers not under state commissions.

Controls Start with Accounting

A FREQUENT oversight found in rural systems is failure to establish proper depreciation. REA has taken pains to acquaint new borrowers with the importance of accrual bookkeeping, budgeting, and financial planning in contemplating system expansion. Larger businesses know these controls are essential in determining what the cash flow position will be at specific times in the future. Very small telephone enterprises find that they have to adopt standard accounting practices and records systems in order to obtain the information they need to operate and manage their businesses successfully.

For REA borrowers as a whole, the median system had operating expenses amounting to $37.47 per station in 1958. Just under half of this total was accounted for as "commercial, general office and other." Just over a third went into maintenance.

An analysis of the expenditures of REA borrowers shows labor and motor vehicle operations to be the two largest items. These happen to be expenses which can be kept under control by good management. Proper work schedules and careful supervision are especially important in small systems providing rural service, because their limited size does not offer the flexibility that larger companies have. Besides this, the long distances involved in rural systems make savings in travel time and vehicle expense important.

In rural areas where operating margins are narrow, even small economies assume importance in telephone system operations. Insurance is one of the operating expenses which REA borrowers examine closely with an eye to savings. Substantial reductions may be obtained by shopping around and comparing premiums and coverage offered by several companies and different agents. And in the long run, insurance costs are reduced by establishing and maintaining effective safety programs.

A relatively new area in which REA is advising its borrowers to look for savings is trouble reporting. Accurate, detailed trouble reporting records that show the exact location and the specific cause of the complaint can help cut maintenance expenses in two ways:

(1) By showing locations where emergencies are apt to occur, and

(2) By revealing what type or make of equipment is a frequent source of failure and complaint.

Analysis of this data makes possible better utilization of line crews by the scheduling of replacements in an orderly, economical routing, and indicates kinds of equipment and materials to be avoided in the future.

In discussing personnel costs, it has been the rather general experience of REA borrowers that merchandising expenses, wisely supervised, more than offset their cost by increasing revenues. It has been found that planned promotional selling by the entire staff is needed to help rural people get acquainted with the benefits of modern dial telephone service.

Extension telephone, outdoor gongs, long distance service, and classified directory listings are additional services which have a very special appeal to farm families and at the same time contribute to profitable operation of the telephone system. These additional revenues are essential in maintaining margins in rural areas which have few subscribers per mile of line.

Follow a Financial Plan

REA STRONGLY urges each of its borrowers to adopt and follow a financial plan as an integral part of

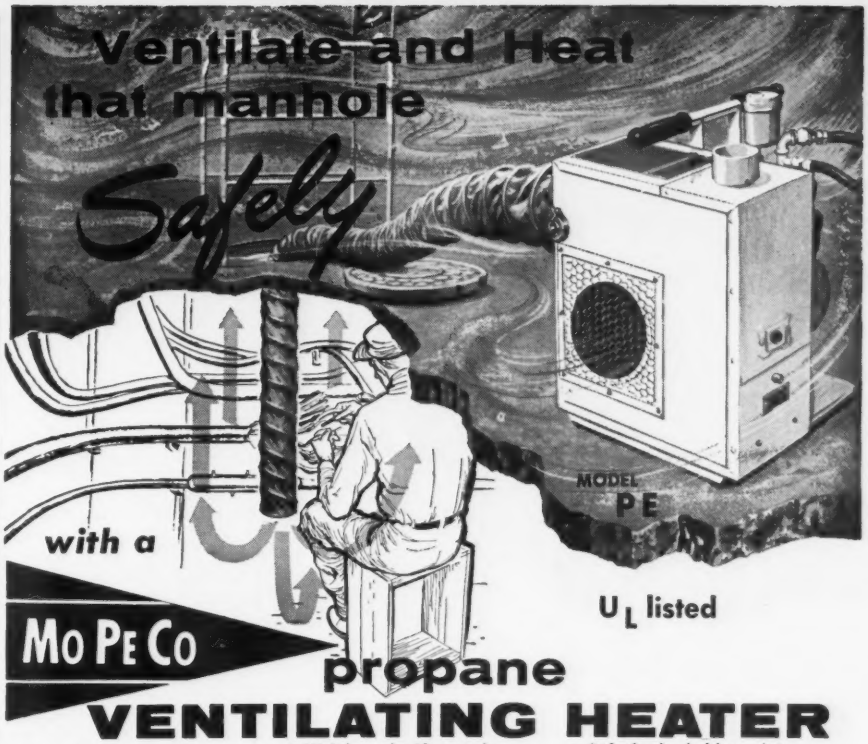
responsible management. Financial planning is essential in determining what additional long-term financing will be needed for system improvements and expansion. Small companies as well as the larger ones find that financial planning provides a means of judging the efficiency of system operations, of establishing service goals, and of identifying areas where improvements are needed.

The Annual Operating Budget

BORROWERS of REA funds are urged to prepare an annual operating budget as a first step in financial planning. In addition, a longer range forecast of operations (covering perhaps from three to five years) should be made and used. This takes into consideration the effects of such factors as subscriber development and maximum interest and principal payments on the REA notes. Along with this, a forecast is needed of capital requirements to finance necessary system improvements and additions. The source and application of funds required for all corporate purposes should be anticipated in long-range financial planning.

Financing through long-term loans was the key that unlocked the door to large-scale development of modern telephone service for rural areas. But money alone would never get the job done. Somebody had to turn that key in the door. Alert management in the telephone industry has done that, and is facing the challenge of unserved farm families and poorly served rural subscribers.

It is generally recognized now that the demand for adequate service in rural areas cannot be satisfied by patching up tiny magneto systems that still thread their patterns down country roads. The modern telephone enterprise cannot be run by one man, keeping his operating data on the backs of envelopes. Running a telephone system today calls for skilled technology and careful business management. Developing rural telephone service in the 1960's calls for intelligent, purposeful planning. — *David A. Hamil.*



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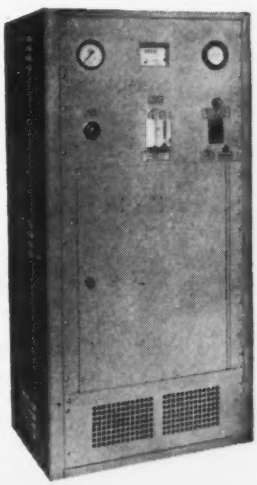

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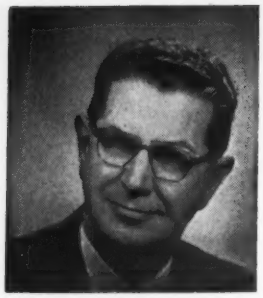

TRAFFIC LIGHTS

By D. A. PERIGO
General Traffic Supt., West Coast Tel. Co., Everett, Wash.

How Useful Are Office Comparisons?

Would it be a better idea if each office were compared with its own past instead of being hounded with "You should be able to do as well as office B"???

THE TRAFFIC unit has been the basis of measurement of Traffic Expenses for many years. There is no doubt that a common denominator is required when it is necessary to compare one office with another, but we always seem to come up with another question, "Is it necessary to compare one office with another?"

With this question we see many Bell System traffic hands raised in horror at such heretical mouthings. Month after month, year after year comparisons are made between offices, between districts, and between areas. What do they mean? Loads, which supposedly measure the efficiency, are compared. Likewise, the service indices are compared. Are these measurements always valid?

Let's look at an example or two. For the sake of easy illustration let's assume two offices each handling 5000 toll calls a day, each having a toll coefficient of 10.0, each having a load of 200, and each having a cost per thousand units of $12.

This means each office has exactly the same number of originating calls that require the same amount of work time at the same cost. Our toll revenues come from the completed messages. One of these offices completes 75 percent of its calls, the other 80 percent. From the above we can see it costs $600. a day in each office. (5000 calls × coefficient of 10.0 × $.012 = $600.) But, 75% of 5000 is 3750 while 80% is 4000.

If we divide the $600. by each of these figures we find that in one case our cost is 16 cents per message while the other is 15 cents. By the usual comparison the offices are equal — but another way to measure the unit cost relates to the *finished product*. The shavings, the imperfections, and the wastage, which are thrown away, are a part of the cost of manufacture. The uncompleted calls are a part of the cost of the completed messages in our business.

What actually happens under the present method is that we measure the cost of units of *work* rather than units of *production*.

Using the same figures above, but adding 0.3 unit to the coefficient of 10.0 for mark sensing the called number, we have a coefficient of 10.3. Just changing this one figure in the above formula gives us a daily cost of $618. — which when divided by 4000 is 15.45 cents instead of 15 cents. The office carries the same load with the same cost per thousand units so the story is that it is just as efficient, but again when the finished product is measured there is a higher cost per message.

In the case of mark sensing we are not saying that this amount may not be saved some other place. We are saying that present traffic measurements do not reflect the increased cost in the usual comparative reports.

Just why is it necessary to compare one office with another? Are there any two that are exactly comparable?

A future article will deal with the matter of coefficients in more detail but here we will mention just one item in connection with their use. One toll center is 28 miles from a metropolitan area while another is 32 miles. The dividing line on coefficients is 30 miles. That's the way the average works out — but for two offices located like these, one enjoys a 0.91 coefficient advantage over the other — and this shows up in comparisons between offices. It means that if each office has a thousand calls to that point the nearer one must handle those calls with about 4.5 hours less operator time than the other.

We have made remarks before about statistics which are useful and those which are nice to have. We wonder sometimes as to whether the statistics that compare offices are really useful — or whether they are something which has grown over a period of years until they are used because we have failed to challenge their value.

Speed Of Answer

BEARING in mind the relationship between service and cost, we have another question. Does the

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average customer recognize a difference of one second in the speed of answer? An average answer of four seconds is the equivalent of about 8 percent answers over 10 seconds. Scoring this on service observations means credit for 19 of a possible 20 points. On the other hand an average answer of five seconds is the equivalent of about 12 percent answers over 10 seconds. When this latter is scored it means a credit of 14.0 index points or five points less. This seems like a terrific penalty for a difference in speed which the customer probably does not notice.

There are experiments being conducted with Person DDD traffic where the customer dials "Zero" followed by the called number. If he wants the operator he also dials "Zero" and if he dials nothing more in the next 3-5 seconds a signal appears before the operator. If her answer is in four seconds it means the customer waited a minimum of seven seconds. If service observations are intended to represent the service the customer receives, how can a seven second minimum answer be tolerated in this office when a five second average answer is not acceptable in the other offices?

The mathematicians, of course, point out that with an average answer of five seconds there will be some cases of longer waits than with an average of four seconds. This is accepted with the vernacular "So what?"

Now let's tie these two items — loads and service index — together. I wouldn't exactly advise any Chief Operator or District Traffic Superintendent to say "Yes, my toll service index is only 94 but all the points are lost on answers to recording signals. The average answer is only five seconds and the subscribers have not complained. My loads are high and cost per thousand units low. The traffic expense per message is lower than in comparable offices."

Put yourself in the customer's place and ask yourself this question. "Would I be satisfied with the speed of answer if the operator answered after one ringing signal nine out of ten times — (90 percent of the time)?"

There is another point involved if you have operator identification DDD. If your CLR service is too fast you'll have difficulty getting your customers to keep on using DDD.

Would it be a better idea if each office were compared with its own past instead of being hounded with "You should be able to do as well as office B"? It would seem to me that if this were done office A would be more likely to spend its time finding one way to improve instead of ten reasons why they are not like office B. Such an attitude would be a more productive use of time.

COMMERCIAL DEPARTMENT NOTES

By ALLAN R. STACEY
Vice Pres., Sunland-Tujunga Tel. Co., Sunland, Calif.

"Your Ideas Are Wanted"

Author Allan Stacey is planning the subjects he will discuss in his TE&M department during 1961. Here's your opportunity to help him select subjects of immediate interest to you.

LETTERS . . . we get letters. Letters from readers of this column, from all over the United States. During the past year we received mail from telephone companies ranging in size from the Nocona Telephone Co. in Texas to the Illinois Bell Telephone Co. in Illinois, from the Garden Valley Telephone Co. in Minnesota to the General Telephone Co. of Florida.

Some of the names associated with the companies or their communities made me want to travel. For example, I am very interested to see whether the Nash Telephone Co. of Damariscotta, Maine uses Fords, Chevrolets or International Trucks. I'd like to see the Star Telephone Co., Inc. of Maringouin, La. During the hunting season I'd certainly like to visit the Dundee Telephone Mutual Aid Corp. of Killdeer, N. D.

If we wanted to travel to foreign countries we could visit readers of this column who have written from the Consolidated Telephone & Radio Company, Ltd. in Isreal or the Northern Telephone Co., Ltd. in Liskeard, Ontario, Canada. I am most intrigued by the mailing address of the Jamaica Telephone Co., Ltd. which reads, "Forty-Seven Half Way Tree Road, Kingston 5, Jamaica, WI." I wonder what Half Way Tree Road looks like.

All of these good people, and many others, have written regarding the ideas expressed in this column but now I need the help of every reader. Would you please stop your reading and pick up your pencil in order that you may mark with a circle each of the following subjects that you would like to see covered in a future Commercial Department Notes article in *Telephone Engineer & Management?*

You see, I am somewhat in the dark as to what you would really like to have discussed in this column and the best way for me to find out is to ask you directly.

Following your marking of the items in which you are interested, please tear out both pages from this magazine.

First, please use your pencil to put a circle around the following address: Allan R. Stacey, 8000 Foothill Boulevard, Sunland, California, U.S.A. Please mail these sheets to me at this address.

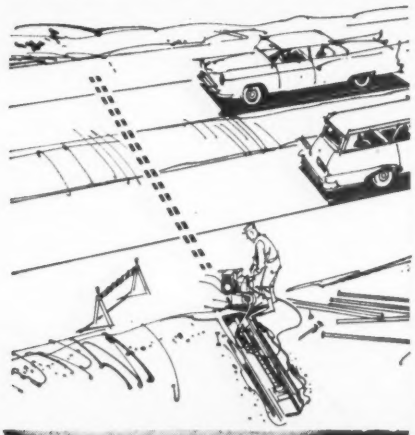
Now, take a firm hold on your pencil and circle the numbers of those ideas in which you are most interested.

THE IDEA LIST

(1) Protecting Yourself on Foreign Exchange Rates.
(2) Introducing the New Employe to His Job, the Company and the Public.
(3) Pro and Con on Employe Sales Awards.
(4) Commercial Office Floor Plans.
(5) Telephone Credit Cards.
(6) The "Remote" Plan for Service Representatives.
(7) Small Paystation Booths and Their Use.
(8) New Sources of Revenue For 1961.
(9) Year Round Training Program for Service Representatives.
(10) Christmas Sales Promotion.
(11) Tracing Nuisance Calls at Subscriber Request.
(12) A Check List for Giving an Open House.
(13) The Case for a Higher Monthly Rate on Luxury Services.
(14) The Treatment of Delinquent Accounts.
(15) All-Numeral Telephone Numbers.
(16) Using Advertising Materials from Telephone Advertising Institute.
(17) The Effectiveness of Newspaper Advertising for a Telephone Utility.
(18) Can We Afford to Buy New Types of Station Equipment?
(19) Maintaining Good Public Relations in the Age of Dial Service.
(20) Marketing Seminars by the National and State Telephone Associations.
(21) Improving Connecting Company Relationships.
(22) The Value of Telephone Numbers on Company Letterhead.
(23) Holders for Telephone Handpieces.
(24) How to Train Management Personnel.
(25) Pro and Con on the Princess Telephone.
(26) How National Yellow Pages Service Works.
(27) Should we Accept Service Applications by Telephone?
(28) Are You Really Service Minded?
(29) Aptitude Tests for Use in Hiring.
(30) Giving Your Subscribers a Daily Calendar Booklet.
(31) Payment Boxes Outside the Business Office.

Next page, please

EASY, LOW-COST WAY TO RUN PIPE UNDER STREETS AND WALKS



Greenlee Hydraulic Pipe Pusher

Traffic proceeds as usual when your piping for underground cable crosses under the street this simple timesaving way. Model No. 790 shown pushes ¾" - 4" pipe about two feet per minute with power pump. A small ditch in the parkway accommodates the pipe pusher — streets and walks remain undisturbed, total job time is cut to a fraction. Ask your supplier for details or write for free literature.

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(Concluded from page 61)

(32) How to Write a Business Letter.
(33) How to Measure the Effectiveness of Your Memoranda.

There were thirty-three ideas. How many did you circle?

SUBMIT YOUR OWN IDEAS

Please use the following four blank lines to write in subjects which were not listed above but which are of interest to you. Don't hesitate to write a letter if four lines are not sufficient space.

.....

.....

.....

.....

Name: .....

Company: .....

Address: .....

THE FINAL STEP

Now, please tear out the pages of this magazine, fold them and insert them in an envelope using the address which you circled above.

Many thanks to you, good reader. It is your interest that will make this column of value during 1961 when I use the ideas that you have submitted.

— *Allan R. Stacey.*

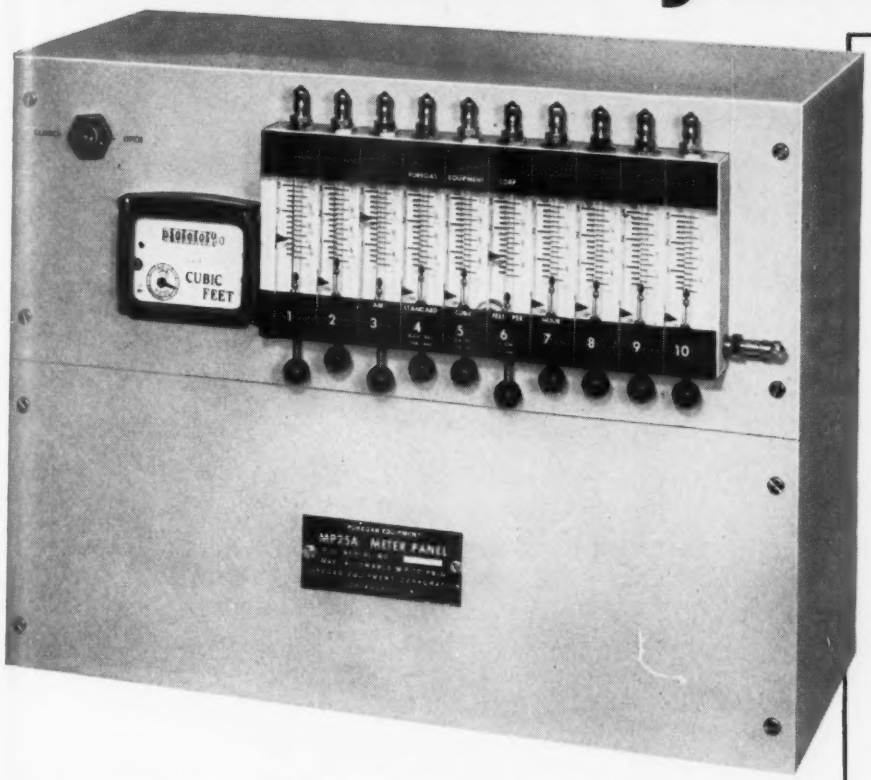
"LEADERSHIP"

TOO MUCH of what passes for leadership these days isn't leadership at all — it's just a big campaign to keep everybody happy — a hand-out here, another one there — a juicy chunk of pork for everyone — pass out the happiness balm — keep all the suckers convinced that they have to stay in line, play on the team — co-operate, don't criticize, don't stir up trouble and dissension — because if you do, you won't be a "nice guy" — and if you aren't a nice guy, you won't belong to our big happy family. If the end-point of our civilization in a drowsy state of mass happiness, we can achieve it a lot faster with an overdose of sleeping pills — which, sometimes these days, I am led to suspect we have already begun to take.

In our drugged half-sleep one of our worst nightmares, it seems, is that we are about to be destroyed because we are falling behind in a mad race with Russia for scientific achievement — and we measure ourselves by counting the number of graduates that we are turning out with science degrees from our institutions of higher learning. We do need scientifically trained people, thousands upon thousands of them — but that isn't really the heart of our national problem. Take the so-called missile race. Are we behind — if we are — because of a lack of manpower in our development laboratories? No, you can't possibly believe that if you talk to the men who are really at the core of this operation. We are fumbling because we have thwarted personal leadership with an impenetrable maze of organizational procedures, buried it in the minutes of uncountable meetings. We have drowned out the clear voice of command by the wrangling disagreement of endless bureaus, departments, branches of the military service, missions, committees — the fantastic fabrication of bureaucratic cells that our national government has grown into being. — *Adapted from address presented by Cameron Hawley at the 58th annual convention of the Pennsylvania Independent Telephone Association.*

TO LENGTHEN CABLE LIFE AND CUT MAINTENANCE COSTS—

Pressurize your cables



Metering Panel of the PUREGAS Continuous Feed Pressure System. The panel monitors and distributes the flow of pressurized air from the PUREGAS Air Dryer to toll, trunk and exchange cables . . . measures the flow delivered to groups of cables or to individual cables . . . provides convenient central instrumentation.

Air Dryer of the PUREGAS system. This compact unit compresses room air and delivers it under pressure to a storage tank, where it is cooled to near freezing. Compression, storage cooling, then expansion to the lower pressures within the cable reduce relative humidity from 100% at high temperatures to less than 2% at 70°F. Air Dryers and Metering Panels, products of Puregas Equipment Corporation, are available via Graybar.

Toll, trunk and exchange cables all have longer service life and cost much less to maintain when they are:

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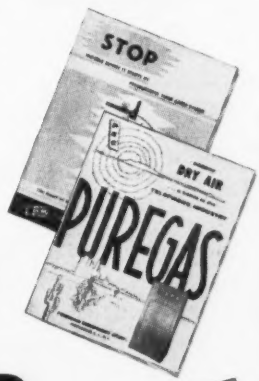
2. supplemented with GENERAL MACHINE PRODUCTS accessories.

PUREGAS equipment at a central location feeds a continuous supply of dry air under pressure into the cables . . . to keep moisture from reaching the conductors. As air is lost through the minute breaks that usually occur in older cable sheaths it is replaced automatically by dry air from the PUREGAS Air Dryer and Compressor.

Serious breaks along the line, however, cause excessive leakage of air, and are indicated on the PUREGAS Metering Panel.

Using GMP accessories, repairmen then pinpoint location of the breaks—by noting differences in air *pressure* at selected points—and make repairs, usually during normal working hours.

Pressurize to minimize outages . . . to lengthen cable life . . . to cut maintenance costs. PUREGAS and GMP equipment is distributed nationally by GRAYBAR.



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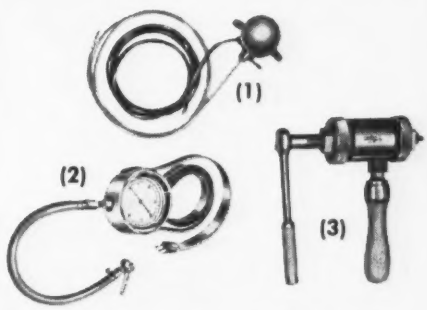

GMP Pressure Testing Contactors (1) located at strategic points, monitor pressure throughout the system and aid in detecting leaks. *Pressure Testing Gauges* (2) give precise measurements of pressure. *Pressure Guns* (3) inject compound into cable to make pressure plugs. These, as well as Pressure Testing Ells, Drills, Depressors, Sealing Compound and other tools for pressurized systems, are made by General Machine Products Company and are available via Graybar.

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WASHINGTON OBSERVATIONS

By ROLAND DAVIES & FRED HENCK

- **Several organizations ask FCC not to grant application of AT&T for approval of a satellite communications experiment.**
- **USITA adopts resolution opposing present policies of GSA in intervening in utility rate cases.**
- **Alaska Tel. plans tropo-scatter system . . . James M. Landis to make study of the organization and functioning of regulatory commissions . . . Western Union asks Post Office to "spell out" it's intentions on "speed mail."**

PROMISING to take its place in the months ahead as one of the key issues confronting the FCC will be the question of allocation of frequencies for space communications.

Not too many years ago, such a subject was considered novel and in the realm of "long, long-range planning," but progress has been swift and the reality of the present is reflected in the fact that following swiftly the application of the American Telephone & Telegraph Co. for approval of a satellite communications experiment, several organizations have come forward and asked the FCC not to grant the request without a hearing and oral argument.

The ultimate decision in the case by the FCC will be a landmark, one of far-reaching importance to all common carriers as the industry moves into the still uncharted territory of providing communications services via objects orbiting in space.

The first opposition to the AT&T application to launch an experimental satellite was filed jointly by the National Association of Manufacturers' Committee on Manufacturers Radio Use and the American Trucking Associations. At almost the same time, the American Petroleum Institute's Central Committee on Communications Facilities voted to submit "vigorous opposition" to the AT&T request for use of frequencies allocated for operational fixed microwave systems in its projected experimental research satellite communications program.

The NAM and ATA declared, in essence, that they do not oppose space communications experiments by the Bell System or other common carriers, but they believe the tests should take place in portions of the radio frequency spectrum allocated for common carrier use.

They charged that the request of AT&T is for space experimentation "on the surface," but "actually, (it) looks to the immediate weakening and ultimate overthrow" of the Commission's microwave policy decision, which opened the way to greatly broadened private microwave use.

The NAM group and ATA filed a petition with the FCC for revisions in the Commission's experimental radio service rules which they said are intended to prevent an experimental grant from becoming "a vehicle for automatic frequency reallocation that might not otherwise be obtainable."

They commented that "notwithstanding" the microwave policy decision, AT&T filed a petition for rulemaking "to make the entire band of 6000 megacycle frequencies set aside for non-common carrier fixed purposes available for common carrier space communications. That petition was accompanied by an application for an experimental authorization for the immediate use of 100 mc of space between 6775-6875 mc for transmission to the satellite repeaters and 100 mc of space between 6425-6525 mc for transmitting from the satellites. The first mentioned 100 mc is in the band 6575-6875 mc, which is allocated for private microwave operational fixed stations and is one of the most desirable point-to-point microwave bands for private systems. The second 100 mc is in the frequency band 6425-6575 mc, which is allocated for private and common carrier microwave mobile systems."

The statement went on to express the opinion that "the primary purpose of the AT&T petition is not to conduct experimentation in the non-common carrier microwave bands, but to undermine the Commission's recent microwave decision, by closing out use of the non-common carrier bands for the purpose intended by the Commission, with the ultimate view of preempting the private microwave spectrum space and, in this manner, obtaining by indirection what the Commission refused to grant directly — namely, the use of all microwave space for common carrier public correspondence."

Describing the satellite experiment as a "commendable effort," the filing asked "But why should the experimentation not be conducted entirely on frequencies already allocated to the common carriers? We think this basic question should be explored thoroughly on the record, with all interested parties participating in the development of that record."

Others who met the Nov. 28 deadline for filing comments on the AT&T proposal included the National Retail Merchants Association, the National Committee for Utilities Radio, the Electric Industries Association, Aeronautical Radio, Inc., and Motorola.

They took the same general position: that they are not opposed to

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experimenting in space communications, per se, but they are against the AT&T suggestion as far as frequencies are concerned.

USITA Opposes GSA Rate Case Policies

THE U. S. Independent Telephone Association's Board of Directors has adopted a resolution, sponsored by President R. A. Lumpkin of the Illinois Consolidated Telephone Co., opposing the present policies of the General Services Administration in intervening in utility rate cases.

USITA reported that the resolution, after calling "attention to the growing conflict over the appropriate roles of state and federal regulatory agencies and GSA in the regulation of carriers and services," provided that "the executive officers of this association are directed to request an opportunity to appear before the Senate Appropriations Committee and such other committees of Congress as may be concerned for the purpose of stating this association's firm conviction that GSA's intervention in regulatory matters should be restricted solely to the presentation of evidence of claimed discrimination against the federal government as a user of service, and that any further or additional participation constitutes dilution of responsibility, unwarranted waste, and duplication of effort."

Alaska Tel. Plans Tropo Scatter System

THE Alaska Telephone Corp., a General Telephone & Electronics Corp. subsidiary, has filed plans with the FCC for a tropospheric scatter radio system to connect Annette Island (Ketchikan), Alaska, with British Columbia and the northwestern United States, to provide broadband communications facilities between Alaska and British Columbia and on to the United States.

Under the program, the Annette Island station would communicate with a similar tropo scatter outlet on Trutch Island, British Columbia, to be constructed by another GT&E affiliate, the North-west Telephone Co., and later with a third tropo scatter station to be built on or near Port Hardy, Vancouver Island. Applications for the Trutch Island station are being filed with the Canadian Board of Transport.

In the filing, President C. H. McLean of the Alaska, North-west, and British Columbia companies depicted requirements for a large number of communications circuits over the route, for the U.S. Air Force, the BMEWS (ballistic missile early warning system) rearward system, and for commercial uses.

Regulatory Agencies

JAMES M. Landis, former Dean of the Harvard Law School who has been designated by President-elect Kennedy as his representative to study the organization and functioning of the regulatory commissions, has made it clear that he does not expect to recommend wholesale revamping of the agencies.

Mr. Landis, in discussing his assignment, has pointed to possible improvements in the workings of the existing agencies, but has showed no signs of proposing a new type of organization or the scrapping of the regulatory commission concept.

"Speed Mail"

IN THE latest chapter in the story of the Post Office Department's program to introduce "speed mail," the Western Union Telegraph Co. has asked the government agency to spell out its intentions regarding any future electronic transmission of mail and to clarify apparently conflicting statements about the government's plans in the "speed mail" field.

The telegraph company's President Walter P. Marshall, in a letter to Postmaster General Arthur E. Summerfield, declared that reports of a press demonstration of the speed mail service indicate that the Post Office Department's planning is now directed to the possible offering of a facsimile service to be provided by the Post Office itself for the handling of "preferred" mail. Such a position would be contrary to the understanding given to Western Union in correspondence and meetings between officials of the department and the telegraph company, Mr. Marshall said.

The statement made by Mr. Summerfield at the press demonstration that the Post Office did not contemplate the establishment of its own microwave system, or the manufacture or production of its own equipment, and that it would plan to ask the communications carriers to lease the necessary circuits to the Post Office "would not resolve the problem inherent in any Post Office Department intent to offer a public facsimile service competitive with our own," Mr. Marshall declared.

The Western Union President also raised a question about the legality of the Post Office offering such a facsimile mail service, and he expressed the further conviction that neither the public nor the Congress would countenance now direct competition by the Post Office Department with private enterprise in the telegraph field, even were such activities lawful. — *Roland Davies & Fred Henck.*

Phone Books Reflect The Times

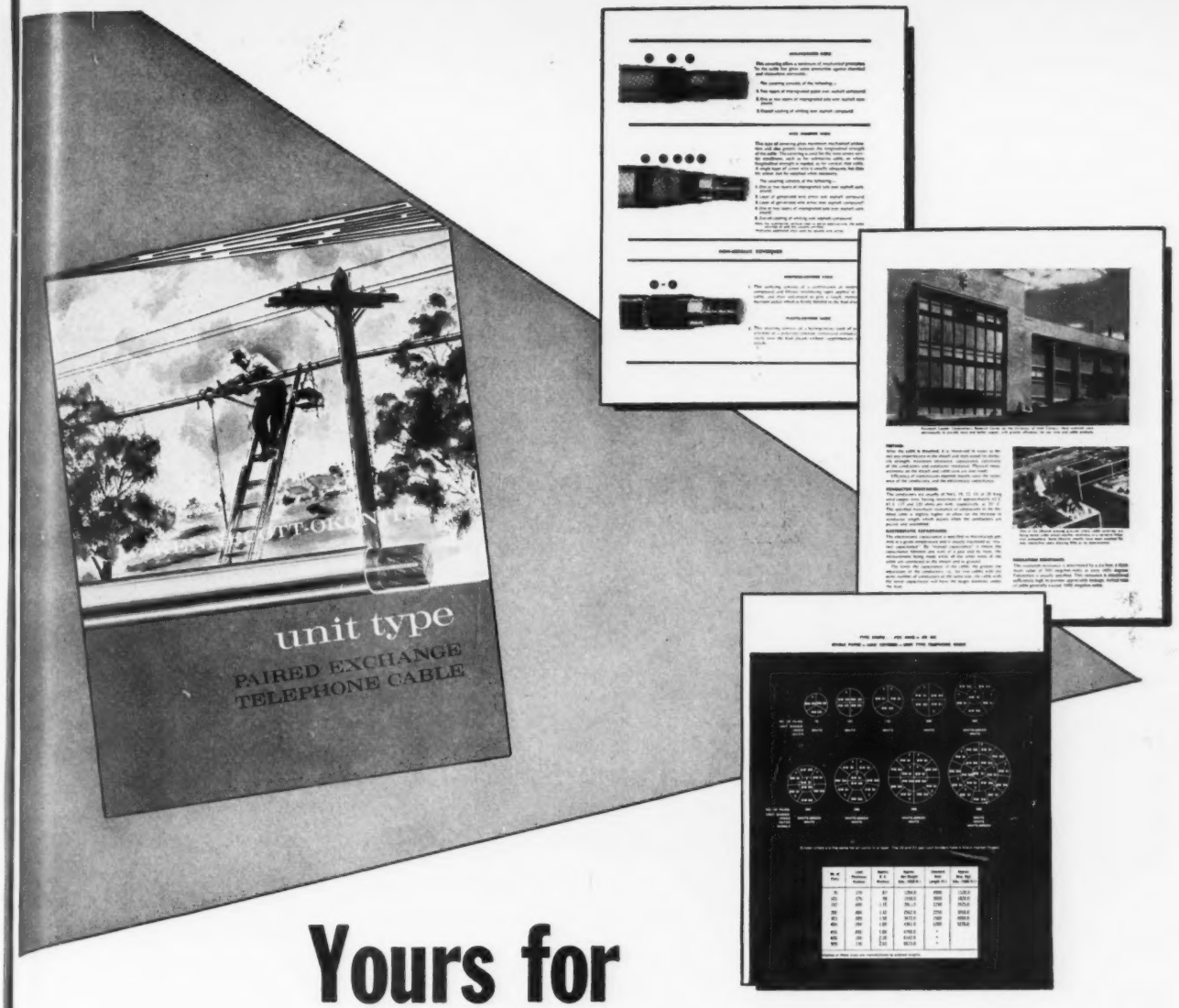
SPEAKING about the phone book, someone once said, "It doesn't have much of a plot, but the cast is sure big."

The Chicago Historial Society, however, feels that there is not only a plot but an invaluable aid to understanding the city's history.

The society recently received 98 rolls of microfilm of Chicago directories from 1878 to 1960 from Illinois Bell Telephone Co.

In 1878 the directory, called the "Telephone Journal," had a mere 12 pages compared to today's alphabetical giant of nearly 1,800 pages.

The World Wars with their shortages of supplies are reflected in the grade of paper and grayer ink. And the economic history is there too: Depression years' directories are thinner.



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HAROLD ROGERS, vice president of the Nevada Telephone Association, addresses meeting of NTA active members.

Accomplishments of U.S. Phone Industry Praised at Nevada Association Meeting

PRIVATE enterprise and telephone industry ingenuity were credited for putting into service more telephones in the U.S.A. than are in service throughout the rest of the world, by USITA President C. C. Pearce, Riceville, Iowa, in an address presented at the 1960 Convention of the Nevada Telephone Association.

Addressing the 167 members of the telephone industry who registered for the three day meeting at the Hotel Riviera, Las Vegas, Pearce reported there is one telephone for each three persons in the United States, compared with an average of one for FIFTY in the rest of the world. "This phenomenal development," he said, "has been made possible by the qualities of initiative and inspired by an atmosphere of freedom and free enterprise in a nation of free men."

Pearce, who is also president of Farmers Telephone Co., Riceville, Iowa, declared no one who is a student of the telephone business can fail to be optimistic about the future of the industry and the advancements which will benefit the public.

Nevada Public Service Commissioner Richard Campbell, told the convention there is "a need for standardized rules of practice and procedure for the telephone industry in

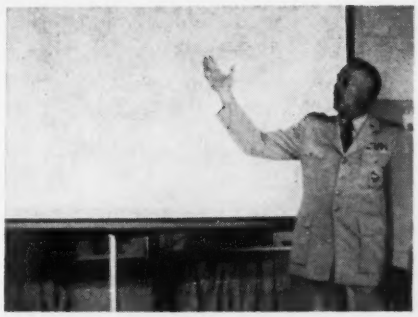
Members of this Nevada convention group are (l. to r.): Mrs. RUBY HUME, WILLIAM DALES and R. T. SMELTZER.

the state of Nevada." He said standardization of rules for the water industry was in the process of formation and asked the aid and co-operation of the telephone association in a similar project. Campbell also stressed the need for better public relations between utilities and consumers. He said that each company operating in the state probably had different concepts of dealing with the public.

Discussing rate adjustments, Campbell said greater advance publication of applications for rate increases should be given the public, and recommended paid advertising space be purchased to notify the public of rate hearings. "These notices," he said, "should be in the display columns rather than in the legal notice section." Campbell said much of the criticism of the utilities and the commission itself was due to a misinformed public and called for greater explanation of "why rate increases were sought."

A dramatic report on the status of the nation's air defense picture during a 24-hour period was made by telephone to the delegates at the Nevada convention. The telephone report was a climax to an address given by Major O. Frank Wolff, executive officer, Office of Information, North American Air Defense Command ("NORAD"), with headquarters at Colorado Springs.

President Frank Dresslar, Sr., president Southern Nevada Telephone Co., placed the call to Colorado Springs to receive the report of Squadron Leader Joseph Connolly, deputy command Information Officer of NORAD, which was amplified for the assembled delegates.



Nevada Convention Speaker Major FRANK O. WOLFF, USAF, executive officer, Office of Information, North American Air Defense Command, Colorado Springs, Colo.

Connolly reported during the 24-hour period, 19 unknown "tracks" were plotted on the radar system. Ten were identified before interception could be completed and five cases were identified visually through actual interception flights. Two were listed as remaining unknown, and were believed to be planes which had crossed the warning line path in short flights and landed before interceptors could reach their position.

It was also revealed 15 fishing trawlers were tracked in the Grand Banks off Nova Scotia and one sub-

Next page, please

RICHARD G. CAMPBELL, member of the Nevada Public Service Commission, addresses the 1960 convention of the Nevada Telephone Association. At left are: Mrs. EVELYN GEROW, secretary; and NTA President JOHN CHRISTIAN, Jr.

HERE'S HOW YOU CAN GET MORE DITCH PER DOLLAR!

Photos above show the versatile Vermeer 4T POW-R-DITCHER digging a gas main trench. Manufactured for the light construction field, this small, inexpensive ditcher is excellent for water and cable lines and home foundation footings.

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marine was reported 400 miles east of Newfoundland.

Major Wolff, in detailing the operation of NORAD and the nation's warning defense system, cited the importance of communications and the participation of the telephone industry.

W. C. Kea, general manager of the Hawaiian Telephone Co., in his presentation to the Nevada Convention, called his department in the Hawaiian Islands where members of his staff put on a demonstration typical of an actual subscriber contact concerned with sales. This demonstration was amplified in order that these in the general session could hear the complete demonstration.

Ray Morgan, manager of California Interstate Telephone Company's Gardenville District, was elected president of the Nevada association. Morgan has been associated with California Interstate since May 1954. Prior to becoming manager in Gardenville, he worked in the company's Bishop office as administrative assistant to the district manager. His experience in telephone work dates back to 1949 when he went to work for the General Telephone Co., in Santa Monica, Calif.

The Nevada Telephone Association is comprised of ten Independent Telephone Companies, and the Bell Telephone Company of Nevada, providing telephone service to approximately 114 thousand telephones and 47 exchanges. California Interstate Telephone Company serves 1536 telephones in portions of Douglas, Esmeralda, Lyon and Mineral Counties.

Other officers of the Nevada association are: Vice President, Harold W. Rogers, manager, Churchill County Tel. & Tel. Co., Fallon, Nev.; Secretary, Mrs. Evelyn M. Gerow, Yerington Electric Co., Yerington, Nev.

Directors are: Paul R. Bond, Bell Telephone Co., of Nevada, Reno; Howard Smith, Nevada Tel. & Tel. Co., Tonopah; Gilbert O. Thomas, Southern Nevada Telephone Co., Las Vegas; and Mrs. Gerow.

Oklahoma Independents Hold Annual Meeting: Program Emphasizes "Planning For The 60's"

EMPHASIZING the increasing importance of electronics to the communications industry, USITA Vice President, Frank G. La Prade, Martinsville, Va., told delegates attending the 25th annual convention of the Oklahoma Telephone Association at the Skirvin Hotel, Oklahoma City, that "We had better start planning *today* on how satellite communications and other rapidly occurring inventions in the electronics field are going to affect us *tomorrow*, and we had better start thinking pretty seriously about what we are going to do to provide a sufficient number of circuits, whether they be physical, radio, microwave, or what-not, to accommodate the numerous types of communications which we will be called upon to handle."

Referring to a recent address of A T & T President Frederick C. Kappel, La Prade stated that Kappel emphasized the possibilities of data transmission, saying it is certain to have a great impact on marketing and distribution, and pointed up the changes which will come about as a result of direct distance dialing.

"Now, all of these things," La Prade said, "will affect each of us, directly or indirectly, and those of us who haven't seriously started to plan for the electronic age of the future had better start doing so without further delay. That is, if we want to stay in the telephone business, and I assume all of us do want to continue in it. As our Washington office reminded us in a recent member letter: "Business is what, if you don't have any, you go out of."

Oklahoma Convention Speaker R.

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- 3 mounting positions—left rear, right rear, behind cab.
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Phelps Dodge will gladly help you fill your aerial and duct wire and cable requirements, recommend the correct constructions to fit your needs. Just call your nearest Phelps Dodge sales office.

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New officers and directors of the Oklahoma Telephone Association (l. to r.): Director, JOE E. TROWER, Mannford; Treas., S. C. RICH, Oklahoma City; 1st Vice Pres., JACK HOLT, Stilwell; Director, O. H. MULLEN, Inola; Sec., HUGH STRAUGHN, Oklahoma City; Retiring Pres., L. A. GUEST, Davenport; Newly-elected pres., HARROLD R. PETERSON, Roosevelt; Director, A. L. McFADDEN, Ringwood; 2nd Vice Pres., TRUMAN WOOD, Kingfisher. Directors W. E. Gosdin, R. E. Harris, and F. E. Messecar, were not present when picture was taken.

L. Post, public relations director, Southwestern States Telephone Co., Brownwood, Texas, also pointed to the future when he told the telephone company representatives "there will be no place in the telephone industry during the 60's for the telephone manager who cannot accept change."

"We're in a period of change," Post said, "because the very makeup of the people in this nation is constantly undergoing change. The population is shifting, altering in character, and those who control the purse strings are ever changing their ideas about what they will buy with the spendable dollar." Stating that public relations will take on new and increased importance during the "60's", Post recommended that each "recognize its public."

"Define your various publics and get to know them well," he said. "You must know who your public is, if you are going to develop a program of public relations action. And don't get the idea that all your publics can be lumped into a 'John E. Public' — mister average subscriber."

Post stated a telephone company has four publics: (1) telephone subscriber; (2) employes; (3) thought leaders in the community; and (4) stockholders.

"Once you define your publics," he said, "you are ready to plan your course of action for the 60's. And regardless of the size of your company, you need a plan of public relations action for the period ahead."

The election held in connection with the convention resulted in the re-election, for three-year terms, of Directors R. E. Harris and L. A. Guest and the election of O. H. Mullen of Inola for a new three-year term.

D. R. Majors of Carmen retired from the board after nine years of

Oklahoma Convention Speaker GEORGE T. GIBSON, senior engineer, Southeastern Bell Telephone Co., with the equipment used in his discussion of "Telephone Science In National Defense."

service to the Association. During his directorship, he successively served as second vice-president, first vice-president and president.

Following the election of directors, the board selected the following officers: President, Harrold R. Peterson, Roosevelt; 1st Vice-President, Jack Holt, Stilwell; 2nd Vice-President, Truman Wood, Kingfisher; Treasurer, Sam C. Rich, Oklahoma City; and Secretary, Hugh D. Straughn, Oklahoma City.

Other directors and their term expirations are: A. L. McFadden, Ringwood; F. E. Messecar, Broken Arrow; W. E. Gosdin, Oklahoma City; Joe E. Trower, Mannford; Harrold R. Peterson, Roosevelt; Jack Holt, Stilwell; and Truman Wood, Kingfisher.

"Competition Is Rapidly Developing," Barnes Tells South Carolina Meeting

ADDRESSING the 26th Annual Convention of the South Carolina Independent Telephone Association at the Clemson House, Clemson, S. C., Frank S. Barnes, president of the association, told the telephone company representatives that "Our business can no longer be thought of as the telephone business; it should now more appropriately be referred to as the communications business."

"As industry, business and government continue to decentralize," he said, "an increasing need is developing for more communication with their wide-spread operations over voice, data and video circuits. We can look for increasing changes in the art of providing these services which will use more and more electronic equipment; equipment such as voice repeaters, special trunk equipment to extend signalling limits, better and more dependable low power transistorized subscriber carrier, improved microwave equipment of greater capacity, improved mobile radio, line concentrators to increase cable capacity, improved cable trunk carriers with their inherent flexibility and adjustable level controls, more buried cable and improved methods of installing, lighter and more efficient telephone instruments, all of which will bring our subscribers more and better service at the least possible cost.

"We have also seen in the past an increasing desire among our subscribers for more special services. The new bedroom telephones, answering devices, home telephone systems, signals and dialing devices are but forerunners of things to come. At the USITA convention, a telephone instrument of conventional size and shape was exhibited which performed all the normal functions of a standard set with-

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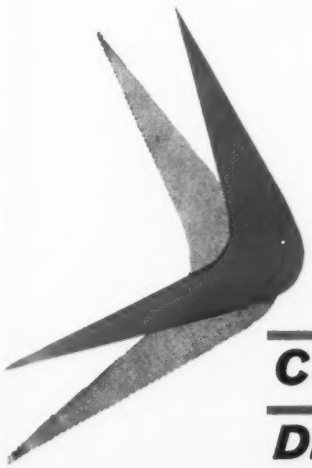

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FOR DIRECT EARTH BURIAL INSTALLATION.
CONTAINING FOUR TO FOUR HUNDRED SIXTY COILS.

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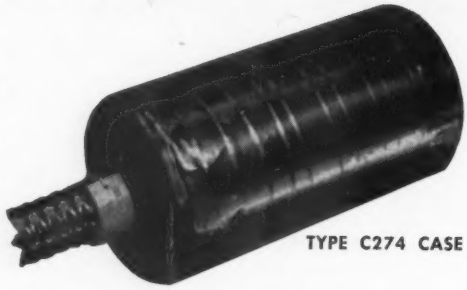
Galvanized steel cases and stub assemblies are completely covered with plastic tape to protect metal from electrolysis or other soil corrosive agents.



TYPE C274 CASE

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- *PLASTIC STUB ASSEMBLIES* ARE ARMOURED AND SEALED IN THERMOPLASTIC COMPOUND TO INSURE PROTECTION FROM MOISTURE.

These assemblies are equipped with voice frequency coils, Types C632 (88 MH) and C638 (44 MH) coils are for subscriber loading, and Types C642 (88 MH) and C641 (44 MH) coils are for use on quadded inter-office and toll cables. Special coils can be made to meet other requirements.

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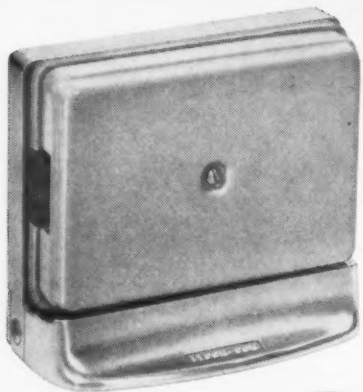
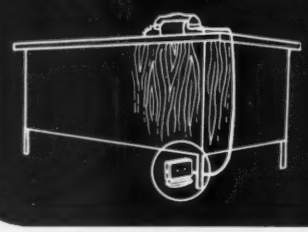
ends needless marring of office furniture





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Comes in four plated finishes: Chrome—satin or bright, and Brass—satin or bright.

All necessary fittings will be supplied to adapt Floor-Con to your particular duct system or floor installation—please specify the type or make in use.

MODEL 102 shown with standard telephone equipment, accommodates up to 6 No. 44-A Connecting Terminals (3 on each side).

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out the benefit of a wire connection."

Emphasizing that in addition to the changes, the telephone industry is faced with increased competition from other organizations selling communications, Barnes referred to the Post Office Department's experiments with facsimile equipment which, to preserve privacy, will be able to see through envelopes, pick up the message on special sensitive paper, transmit it, and then recreate the message on sensitive paper inside an envelope at the receiving station.

"An article in the August 27 issue of *Business Week*," he said, "describes the phenomenal growth which has been made by Western Union in meeting the needs of industry for specialized communications. Yet the article points out that this growth has been accomplished with very little selling for the customers were just waiting for someone to come and sell them this service."

Referring to recent ruling of the FCC making microwave licenses available to businesses for private systems, Barnes stated the ruling has introduced another avenue for considerable competition.

"There are those who do not agree with this ruling of the Commission and feel that it will work to the disadvantage of the general public now being served by common carrier," he said. "We must recognize the realities of the situation and redouble our efforts to see that we make our very best effort to meet the needs of our present customers promptly, efficiently and economically in cooperation with other Independent companies and the Bell Company.

"In order that we will be able to make our best effort, we must remain corporately healthy. We must see that our earnings are adequate to attract new capital, that we provide adequately for replacement of not only worn out equipment but equipment that is becoming obsolete, that our people are properly trained — trained by on the job training and by attendance at industry and manufacturer's schools, and that we do an increasingly aggressive job of finding out the needs and desires of our cus-

tomers and of selling them the service to meet these needs.

"We must work for and support our Association and its committees which offers the best vehicle for cooperation and teamwork between Independents themselves, and between Independents and the Bell Company which is so essential in meeting the strong competition which is developing so rapidly. We must also work individually and through our Association to bring to the attention of those in government the need for flexible regulation to permit controls to be relaxed on competitive services so that we may fairly meet this developing competition."

C. C. Pearce, president of the United States Independent Telephone Association (USITA) and president of the Farmers Telephone Co., Riceville, Iowa, told the South Carolina Convention that the Independent branch of the telephone industry now has nearly twelve million telephones, plant investment exceeding $3.5 billion, gross revenue of $881 million, 100,000 employes, and 250,000 stockholders.

"Our 3,600 companies operate in over 10,000 cities and towns," he said. "Our Independent manufacturers, which provide the physical equipment for Independent telephone operation, have world-wide reputations for the high quality of their products. Without these manufacturers it is difficult to see how there could be an Independent telephone industry. The annual revenues of 100 Independent companies now exceed one million dollars. More companies are graduating into the million dollar class every year. More stations are being added. More plant is being constructed, more money is being invested. Communication frontiers are being made. Conversions to dial are proceding. New records are being established. Of the 125 million telephones in the world, 54 percent are in these good United States."

Officers of the South Carolina Independent Telephone Association (l. to r.): R. E. SEYMOUR, treas., C. B. BARKSDALE, Jr., vice pres., S. S. HELMLY, pres., and B. B. HARDER, sec.

Discussing the future, USITA President Pearce stated, "I feel optimistic about this Independent telephone industry of ours."

"Although we have made significant strides over the years," he said, "there are many — and I am among them — who believe that the brightest era and largest opportunities lie ahead. There seems to be no let-up in demand for telephone service. The population of the country is now 177 million. It is estimated that by 1980 there will be 77 million more people. At the end of World War II, in 1945, the Independent telephone companies of the country had about five million stations in service. Today they have more than twice that number.

"Operating as our companies do in many of the suburban areas adjacent to large centers of population, Independent companies have been and will continue to be the beneficiaries of shifts in population away from the big cities. This is a trend that is certain to continue as long as there is an environment better adapted to a full and comfortable life."

Commenting that growth means problems and "problems have always kept us occupied in the telephone industry," Pearce stressed the necessity for improved recruitment procedures and means of attracting new employes to the telephone business in competitive labor markets.

"More employes," he said, "must be trained for technical assignments and executive, management, and supervisory positions, investors must be wooed more than ever to enable plant additions to be made and expansion and improvement of service to go forward. Every advantage must be taken of advances in the communications art. Regulatory commissions must continue to demonstrate a realistic attitude in dealing with necessary rate adjustments so that a favorable investor climate may be maintained."

J. S. Stone, vice president of the Southern Bell Telephone & Telegraph Co., asked the South Carolina convention, "What are we going to do to meet the challenge of the future?"

"We must have fundamental

Members of this South Carolina convention group are (l. to r.): MRS. CLYDA BELL, MISS LYNDA CRIMINGER, MISS ROBERTA BRADLEY, and T. CARTER THOMASSON, all of Lancaster, S. C.; USITA Pres. C. C. PEARCE, Riceville, Ia.; B. B. HARDER, Sumter; FRANK BARNES, Jr., Rock Hill, S. C.; and S. S. HELMLY, Moncks Corner.

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plans," he stated. "I think we all know that in order to build the most economical plan for the long run we must build for long range plans and, therefore, we should know what those plans are. You should know what our plans are and we should know what yours are. At the same time we should keep each other informed as to the progress and any change of plans that we might see."

Discussing the importance of keeping abreast of the changing needs of the business, Vice President Stone stated, "We need to offer an improved telephone service as we face the challenge of the future, whether that be an improved talking srvice, signaling service, telemetering, teletype, data processing, private lines, closed circuit television, or educational television. Whatever it might be, we must offer that service the public wants."

"I want to particularly emphasize the fact that we must offer the kind of service the public wants," he said, "not what we have on our shelves to give but the kind of service the customer needs for his business, and the service that exactly fits his needs."

Referring to the development of managers, Stone stated, "we need to develop our management people and our craft people."

"We need to develop our management people not only so that they will be better managers of the business," he said, "but so that they will be better technicians and better able to deal with the problems which we are facing with the public. They need to be identified with something. They want something more than just their animal instincts satisfied. They want to be identified with an organization that is on its toes and going, and we need to demonstrate they are with an industry that is on its toes and rendering to the public a service the public wants, and at a cost that it is willing to pay."

Other South Carolina convention speakers were: Norman H. McFarlin, assistant administrator of REA, Washington, D. C., and J. F. Albright, assistant director South Carolina Development Board.

Newly-elected officers of the South Carolina Association are: President, S. S. Helmly, Moncks Corner; Vice President, C. B. Barksdale, Jr., Greenwood; Treasurer, R. E. Seymour, Greenwood; and Secretary, B. B. Harder, Sumter.

Brorein To Retire From Gen. Tel. of Florida; Fred D. Learey Named Company President

CARL D. Brorein will retire on January 1 as president of General Tel. Company of Florida, after 40 years of service with that company and its predecessor, Peninsular Tel. Company.

Brorein, who is retiring under the provisions of the company's pension plan, will become Chairman of the Board of General Tel. of Florida, and will act in a consulting capacity.

He will be succeeded as president by Fred D. Learey, of Cleveland, Ohio. Learey will join the General System from The Ohio Bell Tel. Company, where he is serving as director of marketing, with headquarters in Cleveland. In this post, he has been responsible for the over-all direction of the marketing and sales program throughout the Ohio Bell.

A native of Buckland, Ohio, Brorein attended Oberlin College in Ohio, and was graduated from the University of New Mexico with an A.B. degree in 1917. He served as a Captain in the United States Marine Corps during World War I, and in 1920 began his career in the telephone industry when he became corporate secretary of The Peninsular Telephone Co., with headquarters in Tampa, Fla. the predecessor company of General Telephone of Florida. He subsequently became assistant to the general manager, vice president and general manager, and was elected president of the company in 1938.

Through his long history of public service, Brorein is one of the leading citizens in the Tampa area. He has received Tampa's award of "Outstand-

ing Citizen," and last year the City of Tampa honored him by dedicating the city's new bridge, spanning the Hillsborough River, as the Carl D. Brorein Bridge. He has headed many civic and charitable activities, as well as business and trade associations.

Brorein has played a prominent role in the telephone industry. He is a past president of the U. S. Independent Telephone Association, and has served as chairman of many of the Association's committees. He is a director and past president of the Florida Telephone Association, and a past president of the Independent Telephone Pioneer Association. He is also a past president of the Florida State Chamber of Commerce, and a member of the board of the U. S. Chamber of Commerce.

CARL D. BROREIN, president of General Tel. Co. of Fla., will retire on January 1.

FRED D. LEAREY will succeed Carl D. Brorein as president of General Tel. Co. of Fla.

A native of Findlay, Ohio, Learey joined Ohio Bell after graduation from Ohio Wesleyan University in 1928 with an A.B. degree. He joined Ohio Bell as a groundman, and advanced through various positions, becoming commercial manager in Columbus in 1936. He was promoted to district sales manager, and after three years in the engineering department of American Telephone & Telegraph Co. in New York, returned to Ohio Bell as division commercial manager in Columbus. He subsequently became general commercial manager, and was appointed director of marketing in February, 1960.

New Eskimo Word Goes To Work In Arctic Circle

A NEW Eskimo word went to work October 31 in Kotzebue above the Arctic Circle. It is "okoksoon,"

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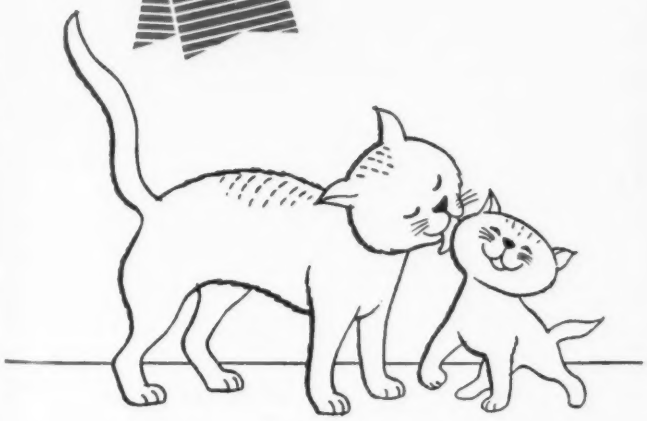

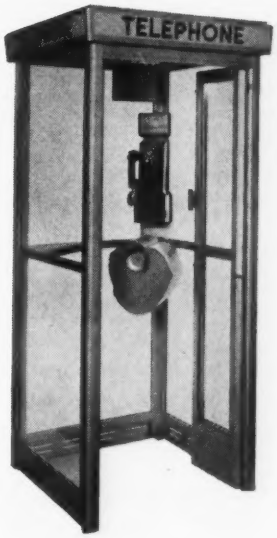

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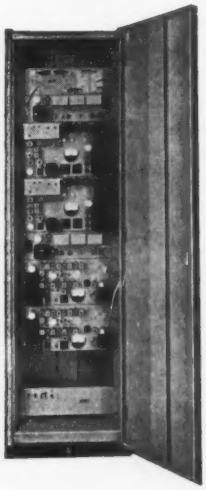

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PAT O'CONNOR, executive secretary to Trans-Alaska Telephone Company Vice-President James Ditto, uses Stromberg-Carlson "Petite" phone to activate new automatic dial telephone exchange at Kotzebue, Alaska, first American phone system north of Arctic Circle. Symbolizing blend of Alaska's new and old, Pat wears typical Eskimo parka, which is standard dress in Kotzebue.

meaning "to talk into a telephone." The word had to be coined for activation of one of the world's modern small telephone exchanges.

Equipped with new Stromberg-Carlson equipment, the nation's farthest north exchange is operated by Trans-Alaska Telephone Company with headquarters in Anchorage. It serves an initial 100 subscribers in the town of about 1900 population. Trans-Alaska's President John E. Field describes the new Kotzebue exchange as solid evidence that American initiative, know-how and equipment provide the best combination for development of the far north. "I doubt very much that any Siberian Eskimo town 10 times the size of Kotzebue can boast of an equivalent telephone system," said Field.

One of 18 Alaskan communities now served by Trans-Alaska, the Kotzebue exchange is rated by Field as one of the continent's most colorful from the standpoint of useage. "It will now be possible," said Field, "through inter-connection with federally-maintained communications, for a New York hunter to sit in his hotel room in Alaska's polar bear hunting capital and talk directly to his office. "I'm sure the new system will be used to report the presence of whales, polar bear, walrus and seals — all important to the Eskimo's economy. It is entirely possible there will be telephone speculation by Kotzebue subscribers as to whether contrails high in the Arctic sky are from American or Russian planes."

How will Eskimo women use their new phones? "They'll use them in the same way as women do all over the world," said Field. "They'll order from the stores, call the doctor and exchange news with each other. There will be talk of departures and arrivals of planes, dogteams and skinboats. I'm sure the new phones will add a beneficial dimension to the lives of these frontier Americans."

Site of a military installation and new U. S. Public Health Service hospital, Kotzebue is one of Alaska's largest Eskimo communities. In the last five years it has become the principal operating base for polar bear hunters.

Harold Lie, Kotzebue exchange manager, listed high winds, permafrost and deep snow drifts as most difficult problems faced by Trans-Alaska in establishing the nation's first privately-operated Arctic phone system.

Since its organization in 1959, Trans-Alaska has brought modern telephone service to 12 Alaskan communities ranging from Kotzebue to Dillingham on Bristol Bay, more than 600 air miles to the southeast. "Our slogan is 'A telephone for every Alaskan'," says Field.

He points to Trans-Alaska's past record and present plans to extend phone service to nine additional Alaskan communities in the next two years as proof that his slogan is coming true.

United States Instrument Holds PBX School

MONDAY, October 24, ushered in a new two-week PBX School at

Students at Type 40 PBX School conducted by United States Instrument Corp. (USI) are (l. to r.): L. D. ARMENTROUT, sales, USI; H. F. CONROY, instructor, USI; RALPH COLEMAN, Tel. Utilities of W. Va.; LISLIE LADD, Murraysville Tel. Co.; and M. BASKA, Jamestown (N. Y.) Tel. Corp.

Operating telephone company personnel attending recent Type 30 PBX School conducted by United States Instrument Corp. (USI) are (l. to r.): R. R. HAMRIC, Florida Tel. Corp.; FRANK A. PATTON, sales manager, U.S.I.; JACK FREE, United Tel. Co. of Pa.; JOHN MENTZER, United Tel. Co. of Pa.; RALPH MILLER, Skyline Tel. Mbr. Corp.; RICHARD EDWARDS Piedmont Rural Tel. Corp.; RICHARD DuBOIS, Jamestown Tel. Co.; PAUL DARNELL, Scott County Tel. Co-op.; KERMIT DOVEL, Harrisonburg (Va.) Tel. Co.; C. L. WOODSON, Virginia Tel. & Tel.; and HOWARD CONROY, Instructor, U.S.I.

United States Instrument Corp., Charlottesville, Va., and operating personnel representing 10 telephone companies gathered to study the USI Type 30 PBX system. Included in the course of study were several in-plant tours for the purpose of observing the manufacture and assembly of the PBX equipment.

The second week brought representatives from three telephone companies to study the USI Type 40 PBX system. Again, in-plant tours brought these men into actual contact with the manufacture and assembly of the equipment.

Similar classes were scheduled for December 5-16, 1960 and January 16-27, 1961.

Trans-Alaska Tel. Names Two Plant Superintendents

TWO VETERAN telephone men have been named to executive positions with the Trans-Alaska Telephone Co., it was announced in Anchorage by John E. Field, Trans-Alaska's president.

Named inside plant superintendent is Charles J. Adams, who has spent the last nine months as equipment and traffic engineer for the City of Anchorage.

Earl D. Kidd, formerly with General Telephone Co. of the Southwest has been named outside plant superintendent.

Trans-Alaska is providing or planning to provide new or improved telephone service to more than 20 Alaskan communities ranging from the Kenai Peninsula to above the Arctic Circle.

A 36-year telephone veteran, Adams began his career with the Automatic Electric Co., Chicago, in 1924. From 1933 to 1946 he was communications and maintenance supervisor for the Rock Island Railroad. Prior to joining the City of Anchorage system in January, 1960, Adams served the Kellogg Switch-

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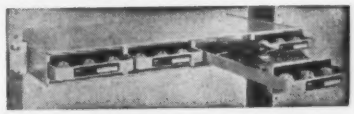

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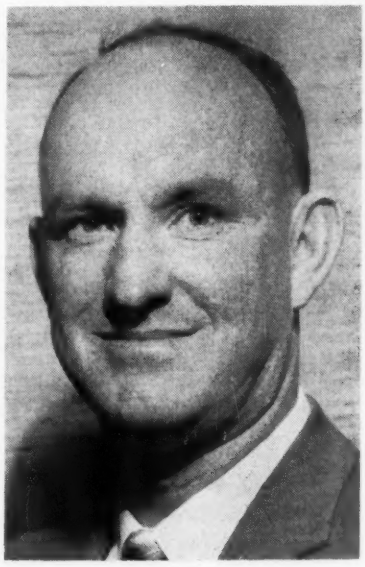
*It's dated for comparison.

CHARLES J. ADAMS

board & Supply Co., first as a development engineer and more recently as West Coast field engineer.

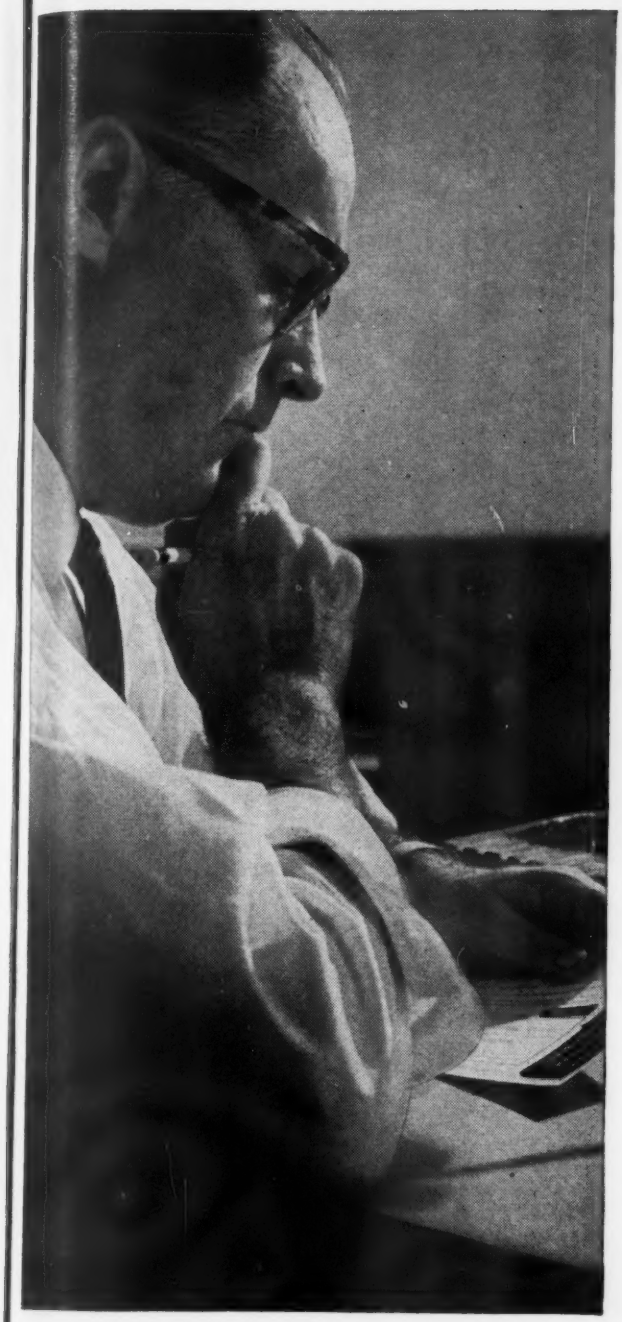
He engineered and supervised the original installation of Kellogg equipment in the Anchorage phone system in 1949, and supervised installation of the Puerto Rican phone system in 1953. Adams did considerable basic work on Kellogg's cross-bar equipment.

Kidd's communication background includes World War II service with



EARL D. KIDD

the Army Signal Corps in North and East Africa. His 13 years with the General Telephone Co., of the Southwest included service as an area engineer in south Texas. He went to Alaska in 1959 as a technical representative for Philco.



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TELEPHONE MANAGER wanted for an 1130 subscriber Independent Company located in Northeast Iowa. All around experience preferred. Please give complete resume of experience and salary required. Write: La Verne Garms, Pres., Luana-Monona Farmers Telephone Company, Monona, Iowa.

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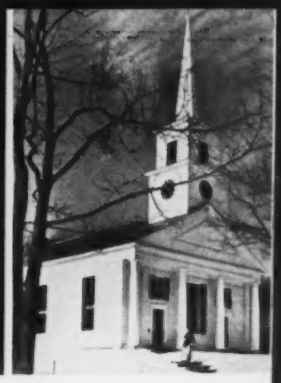

VOLUME 9, NO. 9 • DECEMBER, 1960

Christmas is . . .

Giving

Sharing

Serving

. . . all of these;
but above all it is

the season of friendship!

Serving you
wherever
you live

On this and the following pages are the men who make Stromberg-Carlson more than a business organization. Their satisfaction is to cement strong ties of friendship with personalized service for all customers.

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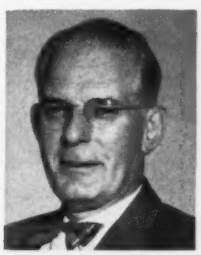

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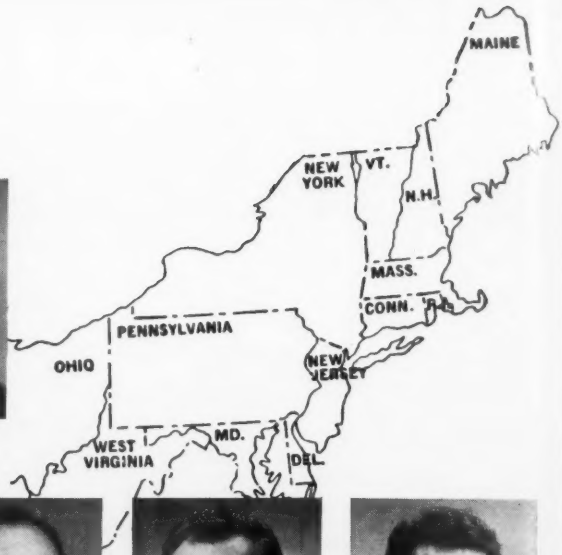

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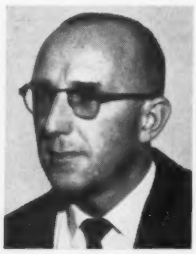

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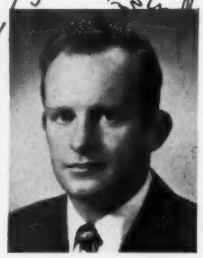

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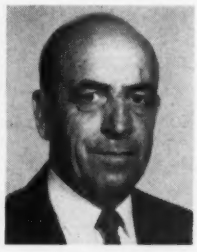

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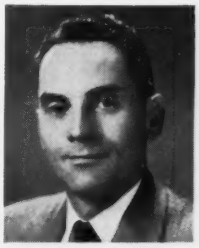

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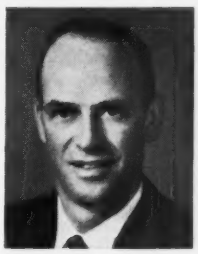

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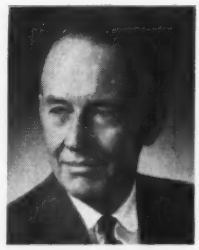

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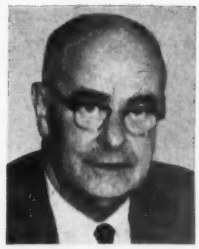

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and Alaska

Sales Engineers

at Christmas time the Transmitter takes pleasure in reversing the camera—usually focused on you, the operating group—so that you may look at us. From each of these men, and other thousands of the Stromberg-Carlson family whose contact is less direct, a Merry Christmas and success to you in 1961.

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Fredonia jumps gun on 100th-year celebration as United Tel of Kansas converts exchange

Late next month, Kansas will celebrate the 100th anniversary of its entry into the Union. However, the people of Fredonia in southeast Kansas had reason to begin celebrating a little bit early. Fredonia recently entered its name on the growing list of towns served by XY® Dial.

The Fredonia conversion was one more step in the United Telephone Company of Kansas' plan to bring dial service to all its subscribers. The company serves more than 38,000 subscribers in the state.

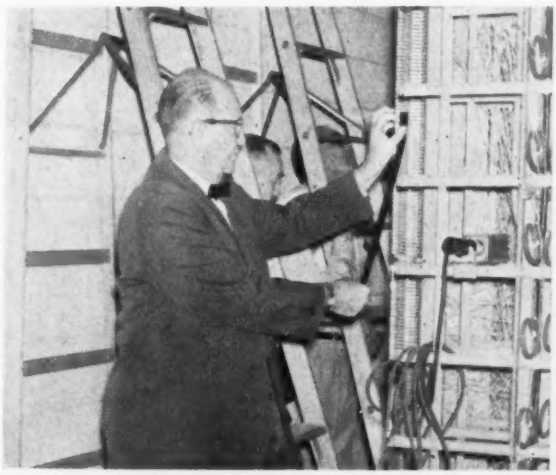
United Telephone personnel conducted an intensive campaign to familiarize their subscribers with the correct dialing procedure. An effort was made to call each subscriber and then have him return the call. This not only acquainted the subscriber with the new system, but provided a check on proper equipment function.

Nearly 2000 stations are served by United at Fredonia. A new dial building was constructed to house the 1050-line XY Dial equipment. A large number of requests for upgrade of service were received at the time of conversion, and this trend is expected to continue.

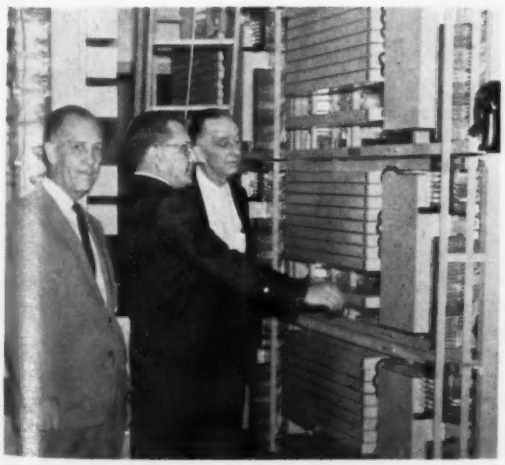
To provide adequate long distance circuits now and in the future, the United Telephone Company coordinated construction of facilities with the Northern Kansas Telephone Company and the Southwestern Bell Telephone Company. These long distance circuits will run to the Independence, Kansas, operator office. In addition, several nearby communities will be linked to the Fredonia exchange through Extended Area Service.

Company officials from Abilene and Kansas City as well as local government representatives, took part in the cutover activities.

These four men, all United personnel, worked together closely to bring XY Dial service to Fredonia. From the left: John Herdt, plant superintendent; Eddie Mares, equipment engineer; H. A. Whitcomb, district manager; and L. C. True, commercial engineer.



"Good service is good public relations." That's the way W. E. Naylor of United's public relations department feels about the new dial equipment.



John Herdt, plant superintendent, illustrates a point about the XY Dial equipment to Howard Sidener, auditor for the United Telephone Company, left, and Don Adams assistant secretary and treasurer.

Max Melton, United equipment engineer, left, and R. L. Tucker, Stromberg-Carlson, complete equipment check before cutover.

Stephen Stott, designer, right; Jack Case, operator, center; and Robert French, builder, of the new test fixture discuss how it gives fast but thorough check on circuit plate reliability.

Faster production pace met by circuit plate tester

Circuit plate production, steadily on the increase, is being checked for quality by a new programmed test fixture at Stromberg-Carlson. The fixture uses programmed panels to keep up with the rising production pace while insuring the normal high reliability of these plates.

Stromberg-Carlson makes more than 10,000 varieties of circuit plates, averaging 450 different types of plates per week.

Since each type of circuit plate requires different tests, setup time for the test procedure was becoming a problem. This time has been cut considerably by using permanently-patched test panels. Simply by changing panels, the fixture can be set up to test a different type of circuit plate.

The fixture is designed to test over the extreme range of high-low exchange battery voltage, line loop resistance and leakage resistance. This insures that each plate will stand up under conditions tougher than are encountered in normal operation.

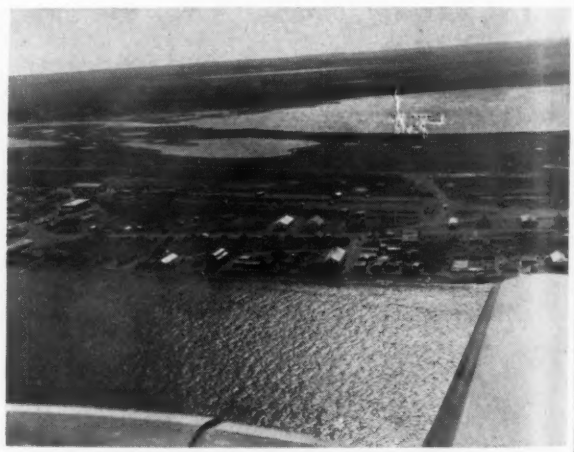
A complete connector circuit, similar to those found in actual exchanges, has been incorporated into the fixture to simplify the test procedure. A built-in transistorized oscillator and amplifier circuit allows the fixture operator to save time by checking for proper function without actually lifting the test phone to his ear.

Another feature of the new test device is a color chart which expedites proper programming.

XY Dial inside Arctic Circle: Kotzebue, Alaska

Kotzebue, Alaska, served by XY Dial through the Trans-Alaska Telephone Company, lies just inside the Arctic Circle on Kotzebue Sound. This predominantly Eskimo village can expect temperatures down to 50° below zero this winter.

The Kotzebue exchange is served by a COMPAK-I, Stromberg-Carlson's new 100-line CDO. Trans-Alaska plans several more of these installations in other Alaskan villages.



Kotzebue Sound shimmers in the sunlight in this aerial view of Kotzebue, Alaska.

Boats abound along the Kotzebue shore. In the winter when area waters freeze over, ice fishing furnishes a large part of the daily diet.

Transmitter
GEORGE B. FORBES, Editor
J. T. LONG, Associate

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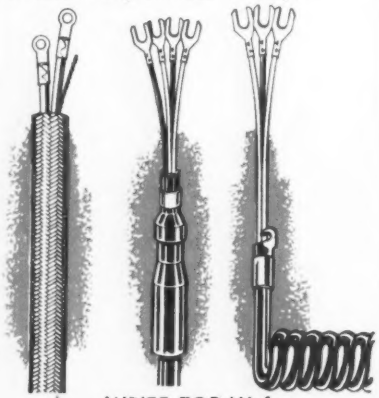

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Gold Rush City Gets a Telephone

WHILE scientists forge ahead with plans for space communications facilities, newspapers recently heralded the advent of the telephone at Dawson City in the Yukon Territory.

It wasn't a "cutover" exactly. In fact, only one phone was installed in the fabled Klondike gold rush city. The occasion: 62nd anniversary of the discovery of gold in the Northwest.

Prior to the installation of the 350-mile Canadian National telephone and telegraph line, the only "outside" communication was by wireless telegraph.

Can They Talk?

WE understand the service representative at Coffeyville, Kans., doubted her hearing ability when a woman caller said. "We'd like to have a telephone installed for our worm farm."

"Forawhat?" asked the service rep, not believing what she'd heard.

"For our worm farm," the woman repeated.

"Are you saying W-O-R-M?" the service rep asked, still thinking she wasn't hearing correctly.

Worm it was. It seems the lady and her husband were starting a business raising worms to sell to fishermen — 15 million worms, no less.

All-Number Calling

ACCORDING to George R. Smith of the Rock Island (Ill.) *Argus* his first story about the 7-digit, all-number dialing for phones started building itself at about the time the Rock Island dialing change went into effect, and Joe Arndt, Rock Island, assistant to the president of Modern Woodmen, was in an elevator at the Fort Armstrong Hotel. He was wearing one of the "78" emblems, which Woodmen agents wear to signify the company's 78th year.

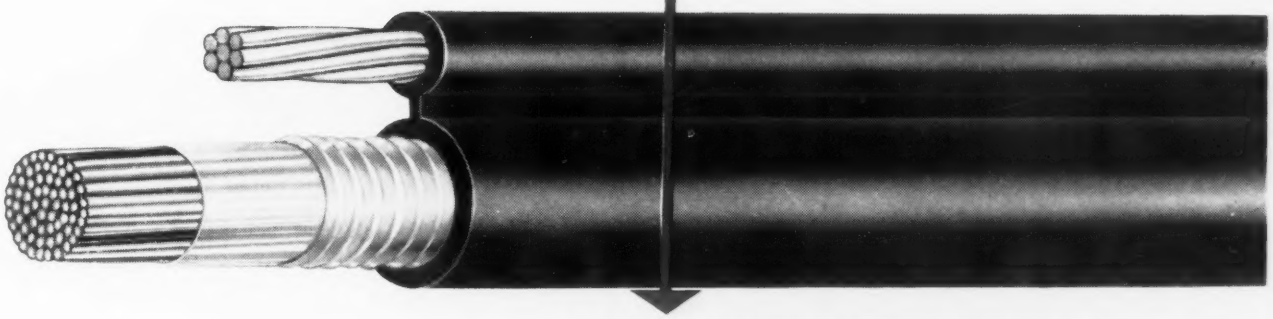
Someone on the elevator noticed the emblem and commented: "It is simply amazing the ends to which the phone company will go to call attention to the changeover to the prefix 78 for Rock Island phone numbers."

"No Pay — No Service"

IN Rowley, Ia., a lot of the town's telephones weren't ringing during the Thanksgiving week-end. They had been disconnected by the Eastern Iowa Telephone Co. because subscribers refused to make even part payment on bills that are two months overdue.

The dispute is over a $4.25 per month rate set by the company after it installed a dial system. About 120 of the 225 subscribers in the northeast Iowa grain and livestock farming area contend the rate is higher than was quoted by company officials when the dial system was planned.

Exchange Area Cable that cuts installation time **in half!**



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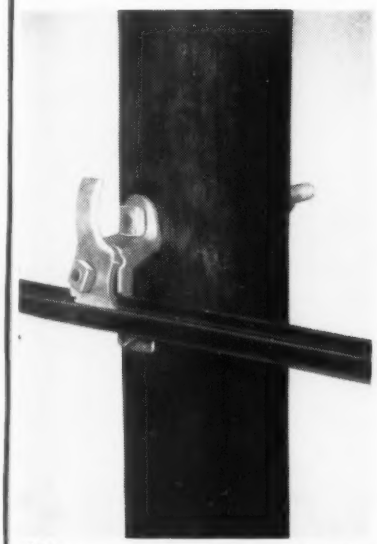
I. M. CABLE



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- **Needs no separate messenger**
- **Requires no special hardware**

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Take a man like
Earl Fox

Earl is one of our "Revenue Men" in Erie, Pennsylvania.

When he graduated from high school in the year 1941, Earl saw his immediate future already determined by world events. He joined the U.S. Navy three months prior to Pearl Harbor, and served five years as a submarine signalman.

Back ashore in 1946, Earl went right to work furthering his education. While earning his B.A. at the University of Southern California, he tackled a load of spare-time work to gain business experience and pay for half of his college expenses.

Earl joined General Telephone Directory in 1952 as a foreign sales representative in Long Beach. He came cross-country two years later to take over as Sales Supervisor of our Johnstown, N. Y., unit, then became Sales Supervisor in Erie in 1957.

He and his wife Donna have three young Foxes: Karen, 9; Janis, 10; and son Dana, 13. Definitely outvoiced at home, Earl finds the Toastmasters a perfect outlet for his interest in public speaking. He is also very active in church affairs.

This is Earl Fox, our Sales Supervisor in Erie, Pennsylvania. He's typical of the "Revenue Men" who work for General Telephone Directory Company . . . and for you. They're always an asset to any community.

You get more than extra sales when you put one of our "Revenue Men" to work on your directory.

His manners, his methods will be a positive credit to your company. He'll be welcomed by your advertisers.

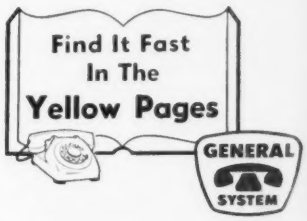
He'll work together with you to produce a book you can be proud of. A directory with complete Yellow Pages service—showing the public where to go for all kinds of purchases, rentals and services. A directory with maximum accuracy, maximum revenue.

And you won't have a worry in the world. Selling, publishing and printing are all done to perfection as part of our Complete Directory Service Plan.

Want to know more about it? A phone call or letter to our nearest office will bring a representative on the double.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Illinois
VAnderbilt 7-6111



DIVISION OFFICES:

Bloomington, Illinois • Columbia, Mo. • Durham, N. C. • Erie, Pa. Fort Wayne, Ind. • Honolulu, H. I. • Lexington, Ky. • Long Beach, Calif. Madison, Wis. • Manila, P. I. • Muskegon, Mich. • St. Paul, Minn. San Angelo, Tex. • San Francisco, Calif. • Spokane, Wash. • Tampa, Fla.